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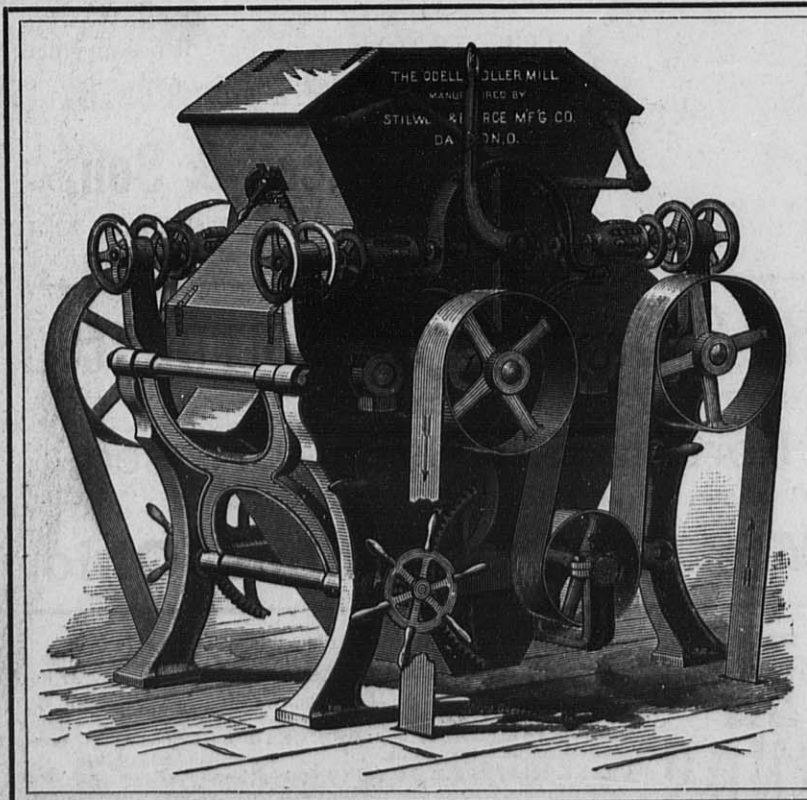
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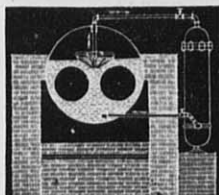
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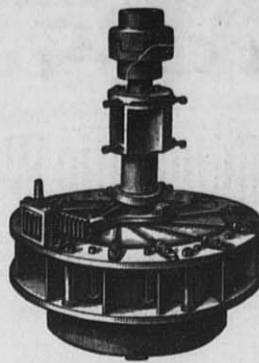
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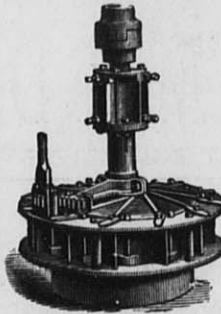
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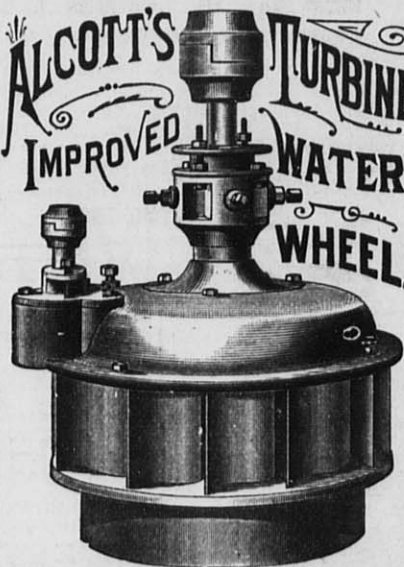
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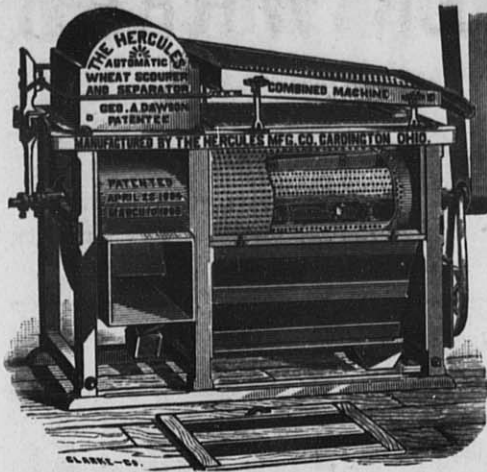
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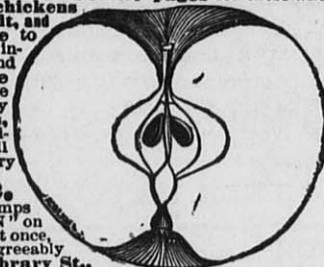
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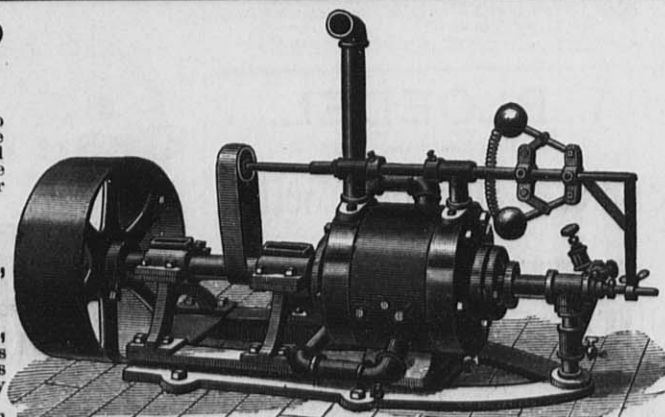
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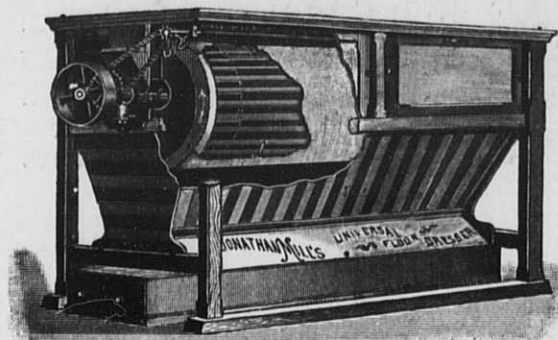
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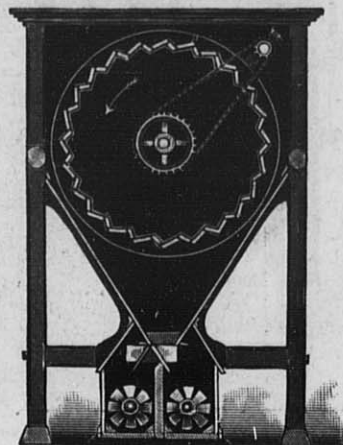


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The United States Miller



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MILLSTONES.*

FACING, HANGING AND RUNNING.

By BRYAN CORCORAN, OF 31 MARK LANE, LONDON,
E. C., ENGLAND.

[The following article was read by its author, Mr. Corcoran, before the meeting of the British and Irish Millers' Association, and here appears, as amended by the author.]

GENTLEMEN—Mr. Alderman Hadley honored me with a request to read a paper, which I have now much pleasure in doing. After some consideration I came to the conclusion that the most important study of a miller is the true face and working of a millstone, and I think the subject is of increasing importance. Mill-stones are not displaced from their high position by roller mills.

The millstone can fairly afford to allow the roller mill to assist in some departments, but when the roller mill threatens the very existence of the millstone, it is time to step forward and challenge its arrogant pretensions.

"Demetrius, the silversmith, who made silver shrines for Diana," said to the craftsmen at Ephesus, whom he called together with the workmen of like occupation, "Sirs, ye know that by this craft we have our wealth."

In like manner I come before you as an advocate for the millstone, as a millstone maker of the third generation, my grandfather having started the business nearly 100 years ago. Here, thanks to the establishment of the National Association of British and Irish Millers, we have an impartial tribunal where we can each and all plead our cause, and in our technical papers, *The Miller* and the *Corn Trade Journal*, we can make our voices heard.

Many millstones in use are not suitable for the present new system. There are also a great many millstones hung in such a way that they are incapable of high-class work, and, nevertheless, all these have been doing the work of the country, proving that with superior workmanship, and greater care in details they are capable of doing far superior work. I meet some who do not believe in these niceties, others who do not understand them, and many who do not realize their importance, so I have endeavored to treat each item so that any ordinary workman can understand it, risking repetition of some facts

that are not new; and I have rather tried to include all that bears on the subject in a consecutive form, and so avoid the necessity of repeated explanation every time the subject is brought forward. I feel that if I can impart to you my own conviction I shall have raised the ground of argument from, *Are mill-stones better than rollers? to What is the best dress, etc., for millstones, and best conditions, etc., for rollers, to accomplish any result desired by the advanced miller?* In the natural course of events, some other way than that of running the upper stone may come into use. Some persons advise running the lower stone. The want of practical belief in the necessity of carrying out the details has in many cases allowed the roller millers to gain an advantage.

I have avoided bringing forward any other subject in order to give this one more importance, and I hope an opportunity will be given me to read another paper on the large subject of Millstones at some future time.

FACING.

The face of a millstone should be a "plane" or level surface. (I leave the "dress" and "swallow" for some other opportunity.) Mr. Babbage, writing some fifty years ago, says: "If two surfaces are worked against each other, whatever may have been their figure at the commencement, there exists a tendency in them both to become portions of spheres. Either of them may become convex and the other concave, with various degrees of curvature. A plane surface is the line of separation between convexity and concavity, and is most difficult to hit; it is easier to make a good circle than a straight line."

The plane may be obtained with machinery, as in turning and planing. In obtaining it



Fig. 1.



Fig. 1A.

by hand with ordinary "stone-staff," however much or little of the surface has to be taken off, I think it is easiest to mark out beds or spaces across the face, just wide enough to allow free working of the stone-staff. Some men say they can do without, but I have never known them to do so, or certainly not without *wasting their labor*.

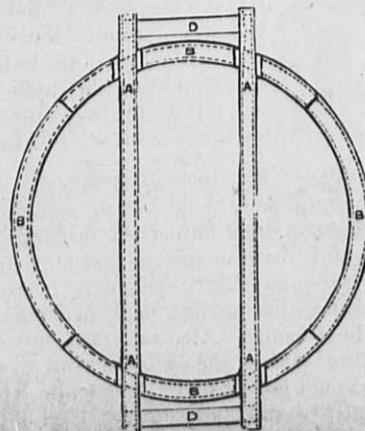
The number of beds I prefer for many good reasons is three, fig. 1, supplemented by three

others as in fig. 1A. These beds indicate *definitely* where the plane or face will be and are themselves part of the finished face. Each bed must be made true from end to end before beginning the next, and each bed must "staff" on all beds that it crosses. My workmen have to follow this plan, and they all prefer it to any other when they once understand it.

In turning and planing, accuracy depends on the machine. Machines standing on the face of the millstone naturally follow the inaccuracies of the surface on which they rest and give bad results. The idea of the lathe may be obtained for hand work by using a trammel to staff a ring or circular bed on the face of the stone, and the idea of a planing machine is obtained with the straight beds, the intervening surface in both cases being levelled with the aid of the staff and mill-bill (mill-pick) for I do not intend to consider the relative advantage of the "diamond," "corundum," or other means.

A circular staff indicates at once the high place, as it cannot mark the low parts, and is certainly almost indispensable to a miller who wishes to keep his stones in floor or out of winding. It can only take a bearing on the part that wants taking down, so that it requires less skillful handling than a straight staff. A miller seeing it used for the first time would be surprised to find how few of the stones in the mill are true enough to stand the test. The late Mr. Potto Brown, of whom I cannot speak too much, took great pains with his millstones, and I find on June 23, 1868, a patent in the name of Potto and Bateman Brown for a circular stone staff, but it is now public property, as the patent was not carried through.

[The following is a plan of the staff shown at the meeting:]



Potto & Bateman Brown's Patent Millstone Staff.

*NOTE.—The editor of the UNITED STATES MILLER desires to say that this essay was published in this paper in February, 1881, and attracted great attention from all parts of the country, so much indeed that the entire edition was soon completely exhausted. Since then we have been requested by nearly 600 parties to republish the article. During the past few months many millers who had read the article years ago, but had in the main forgotten it, have requested us to republish it. The millstone building establishment, of which Mr. Corcoran is the head, has been established over a century, and they have probably built and sold more millstones than any other house in the world. We think the above statement is a sufficient explanation of our reason for allowing the same article to appear in our columns twice.

A, A, A, A.—Two parallel straight edges built of mahogany.

B, B, B, B.—Circular staff, built in segments and layers of mahogany.

D, D.—Cross bar handles, by which the staff may be held when in use.

I read the following from the specification: "In place of forming the staff as a single straight edge, so that it gauges the stone only in one straight line across it, we so form the staff as to gauge the stone simultaneously in several lines at the same time, and so arranged that should the stone be low on any side the staff may be sure to take a bearing on the high side only, and be prevented from falling into the hollows to color them. We prefer to construct the staff of two parallel straight edges connected together by a circle somewhat smaller in diameter than the stone. When the instrument is in use, color is applied to the straight edge, or it may be to the whole of its face, and the instrument is applied to the stone with one of its straight edges on either side of the centre or eye. These edges (if they alone be colored, as we prefer) communicate the color to the high parts on which they chance to bear; but should it so happen that the highest parts are not beneath the edges, then the ring sustains them out of contact with the face of the stone. The form of the instrument may be to some extent varied, but it will be observed that whereas the staff heretofore employed is a straight edge, taking its bearing along one side only, our improved staff is in principle an extended skeleton surface, which, however it may be applied, takes its bearing on the high parts of the stone only. This skeleton surface or frame is very portable and convenient in use; it is kept true without difficulty, and is easily coated with color, advantages which a complete surface would not have, and the absence of which renders a complete surface inapplicable."

LEVELLING BEDSTONE AND ADJUSTING SPINDLE.

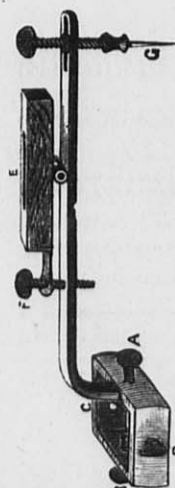


Fig. 2.—Jack-Stick with Spirit Level.

whatever direction the jack-stick is turned.

TO LEVEL THE BEDSTONE.

Without shifting the jack-stick, fix a quill, G, in the end, and adjust the bedstone so that the quill just touches the face all round, and the bedstone will be perfectly horizontal. See that the step and neck fit properly and are held firmly. Also take the precaution before taking the jack-stick off to see that it has not got loose on the spindle, turn it carefully round and see that the bubble

still retains its stationary position, while the quill just touches the face of the bedstone over which it passes.

HANGING AND BALANCING RUNNER.

The "centre bar" should be fixed as centrally as possible (by measuring from the circumference of the stone), or when suspended on the spindle the stone will be heavier on one side than another.

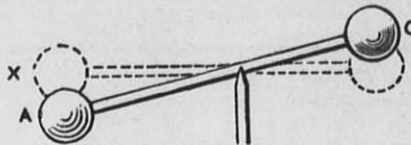


Fig. 3.—Diagram.

The balls, A C, being of same weight, A will hang lower than C.

The stone should be suspended at a point somewhat above its centre of gravity, as it is easily balanced by adding weights to the back of the stone, but if the centre bar is fixed so that the point of suspension is below the centre of gravity, the weights for balancing need to be heavier, and below the face where there is no place for them, and the stone cannot be balanced.

An ordinary scale beam (one, for instance, about 4 ft. long, such as is generally used for weighing sacks of flour) has its knife edge at

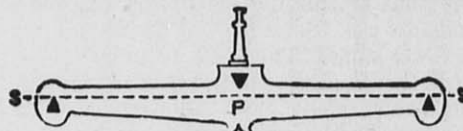


Fig. 4.—Ordinary Scale Beam.

the (pivot) fulcrum, P, about 1-16th of an inch above the line of the "knife edges" S, S (on which the scales hang); if they were on the same level the beam would oscillate too much and make the operation of weighing too slow and tedious for commercial purposes, and if the fulcrum, P, were below the line, S, S, the beam would not oscillate, for either end would remain down without recovering itself.

The stone should oscillate freely on the cockade.

Boxes are provided in the back of the runner for holding lead to adjust the balance of the stone, so that the face is horizontal while it is standing still, but it is also necessary and even more important to obtain as well a

RUNNING BALANCE.

Standing balance is an adjustment for gravitation; running balance is an adjustment for centrifugal action, caused by rotary motion.

Bodies fall by gravitation; bodies fly off from the centre of motion by centrifugal

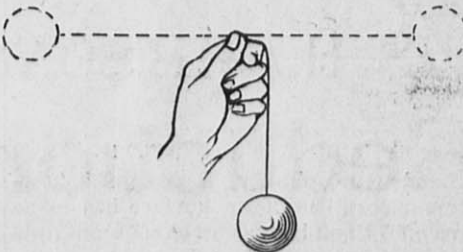


Fig. 5.—Diagram Illustrating the Running Balance—force, and it is only by adjustment of these two antagonistic forces that the face of a millstone can be maintained in a true horizontal position while running.

It is well known that a ball attached to a string when swung round will rise till the string is nearly level. When an ordinary governor revolves, the balls endeavor to fly from the spindle, but the arms being hinged above, the balls must rise to get away, and the greatest distance they can attain is when they are out straight, in a line level with the point of attachment. The greater the speed the nearer they approach this line, and no speed will cause them to rise above it. A millstone that is well and evenly built and balanced for gravitation (standing balance) will run better for the care that has been expended on it, but that is not sufficient to secure a running balance, for it is practically impossible to make a millstone of perfectly even density or weight.



Fig. 3.—Diagram.

When rotated, the ball A will rise and C fall, and at a high speed might be on a line level with the point of suspension and return to the old position as the speed slackened. The same would be the case with balls of unequal weight at equal distance from point of suspension.

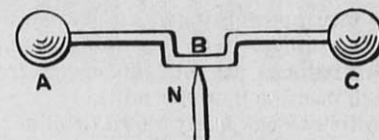


Fig. 6.—Diagram.

Equal balls, equi-distant from but above the point of suspension, when at rest would over-balance, one would be up and the other

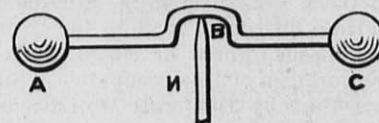


Fig. 7.—Diagram.

down, but both would be level when rotating fast, like a spinning top, as the balls would exert equal power to gain the line level with point of suspension, and wobble and fall again as speed slackened and rotary motion stops.

Equal balls equi-distant from, but below the point of suspension, will retain their level position when at rest or rotating at any speed.

A millstone is built of separate burrs of different densities, and the backing consists of stone chips and cement which is not so heavy as burr.

The heavy or denser burr will fall when standing still, but when running will exert greater force than the light burr towards the point of suspension and cause the light burr to dip, as at Figs. 8 and 8.

Weights may be put in the bottom of the balance boxes that will balance the stone standing, and yet the light burr will dip when running, as at Figs. 8₂ and 8₃.

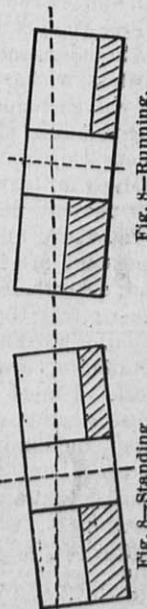
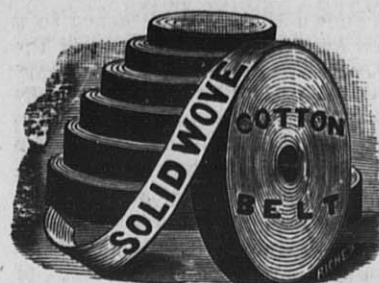


Fig. 8.—Running.

Fig. 8.—Standing.



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The same weights may be so raised that they will exert a force downwards to the line of suspension to compensate the force of the large burr upwards, so that the stone will balance standing or running at any speed, as at Figs. 8₁ and 8₂.

Hence it follows that a stone may balance while standing still and yet not balance while running, and in the same way a stone may balance while running at a certain speed, and not balance when standing still.

Clarke and Dunham's Patent Balance Boxes have iron weights in each, and these iron weights are filled in when necessary with lead, until the standing balance is obtained. The lids of the four boxes are then fixed on, and the weights, which are suspended by a screw, are raised or lowered with a key or socket spanner to adjust for the running balance.

The runner must be raised so as not to touch the bedstone, and made to revolve in the ordinary way.

A quill, or thin flat splinter of wood, dipped in ruddle, inserted between the stones, and the point gradually brought in contact with the face of the runner will mark the face of the stone where it dips, or with care and a little practice, the back of the stone may be marked with a feather, or the fingers dipped in ruddle, on the part corresponding with the part of the face that dips and causes a hissing noise when it touches the quill. The stone must be stopped, and the weights lowered in the box A, where the back of the stone is marked or raised in the opposite box B, by turning the screw with the key to lower or raise the weights. The stone must be again revolved, the side that dips again marked, and this operation repeated until the face of the runner runs so true that no wobble can be appreciated.

The weights cannot shift and the same balance is maintained in good order, and only requires altering with the ordinary wear and tear of the stones.

MACE AND CENTRE BAR.

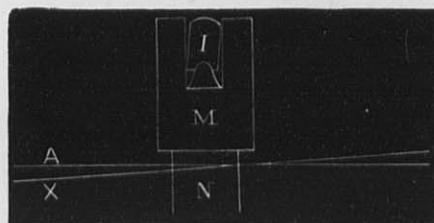


Fig. 9—Mace and Centre Bar.

The mace should grip the centre bar evenly, both back and front, for should the mace M touch the centre bar I, at the slot at the bottom (be the difference ever so little), it is apt to cant the face of the stone from A to X. Pieces of thin paper in the jaws of the mace will be nipped where the pressure comes when the stone is revolved, and the mace or centre bar can be filed or fitted accordingly. The driving power applied to the center bar, above the point of suspension, allows the stone to hang more freely than when gripped below the point of suspension near the mace,

PIVOT OR "COCKHEAD."

A sharp point (1, Fig. 10) is the most sensitive, but with a heavy weight like a millstone, and which has continually to be taken up and put down again, it is apt to wear or get knocked about, which alters the level of the point of suspension and destroys the balance.

If the point is made rounded (2, Fig. 10) it is subject to the same objection, or if it is flat on the top, the center bar is apt to ride, so that a half circular top (3, Fig. 10) or a perfect globe (4, Fig. 10) being more likely to be made true, appears the best, as the level of the point of suspension is the center of the sphere which is the least likely to be altered or affected by any amount of oscillation or wear.

UNIVERSAL DRIVING IRONS

Require to be carefully made, for if the four trunnions are not exactly on the same

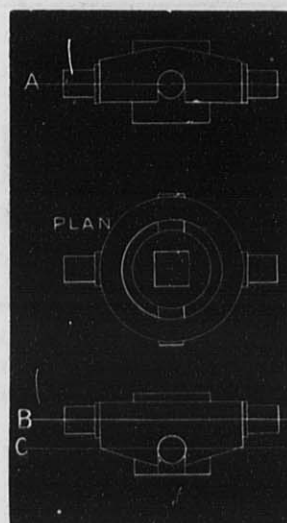


Fig. 11.—Universal Driving Irons.

level, A, it is evident there are two points of suspension or centres of oscillation on two different levels, B, C, and it is very difficult, even if it is possible, to balance a millstone so hung.

These sorts of driving irons also are generally so near the face of the stone, or below the centre of gravity that the stone must wobble or one side drag round on the bedstone until it runs at a considerable speed.

PATENT DRIVING IRONS.

There are many patent driving irons, and some from America are guaranteed to produce a standing or running balance. I have examined a few, but I fail to understand how it is accomplished. By investigating the shape of pivots, levels of the centers of oscillation, fit of the bearings, and position where the power is applied, the weak points may be easily detected, and it should be borne in mind that increased number of bearings means increased chance of inaccuracy.

SPEED.

In England, 110 to 140 revolutions per minute is a fair average for a four foot stone. In France I find it about the same, viz: 490 meters on the circumference.

The dress of the stone must to a great extent be regulated by the speed, quality of the stone, and work desired to be done. The dress that is suitable for 110 revolutions is not likely to suit the quantity of material that would pass through the stones running at 160 revolutions per minute, whether with low, half-round, or high grinding.

RESULTS OF DEFECTS.

If the stone is not pivoted in the center, although it may be balanced so that the face runs in a true horizontal position, or if the stone is not properly balanced, there will be a side strain, causing wear on the side of the neck and toe of spindle and undue wear of the neck and step brasses. If the stone wobbles, or one side drags on the bedstone, the stones wear unevenly, and are apt to strike fire, unless there is sufficient meal between them to protect the surface, like a fender between a steamboat and a landing stage, and some of the flour will be killed and the rest not properly ground, and the meal will be treated as though the faces were not true, causing vibration, waste of power, wear and tear or expenses for repairs, production of less flour, and of an uneven and much lower quality than the wheat is capable of yielding, and requiring finer silks and more dressing and purifying machinery than is necessary; the bran cannot be clean, and some is so finely powdered as to be very difficult for separation.

STIFF DRIVING IRONS.

Keep the stone rigid in the position in which it is set, but it requires care to adjust it each time it is put down. If set exactly horizontal, one side cannot drag on the bedstone, but unless properly balanced it will exert its power to take its own course, which would be a wobble, causing undue wear of bearings, etc., and it cannot well relieve itself should any foreign substance enter with the wheat without lifting the spindle, or the stone if it is loose.

I have heard it stated that a runner hung in the ordinary way is floated, or its weight practically diminished by about 1 cwt. for each bushel of grain ground per hour.

Mr. J. H. Carter, in his paper read before this Association in January last, in speaking of an experiment with stiff irons, says: "We anticipated at least an increase of 10 per cent. of middlings over balanced stones. The result was *nil*, and we attribute it to so much of the weight of the stone being carried by the wheat that the runner, as it were, became unsteady on the irons. It is also more

troublesome to keep in order than the balanced stones. In shelling oats and ending wheat, from which the idea originated, the operation is a light one, no appreciable pressure of the stone being required.

Under-stone running requires very careful balancing, and if fixed rigidly to the spindle it works like on stiff irons. Unless the upper stone is simply held in position by its own weight there is no relief in the event of any foreign substance entering. The advantages are that the feed drops on a live instead of a dead surface, is at once distributed, cannot collect on any part of the face, and is perhaps capable of doing more work than with the upper stone running. With mills of small size any degree of pressure can be exerted, and a large feed can be passed through, which would lift the upper stone off its bearings were it to depend upon its weight only.

There are also advantages for certain classes of work. For instance, in splitting beans, the object is to open, but not in any way to grind them (or a greater quantity is required to fill the bushel), and the live under-stone drives them out as soon as their size is reduced so that they cannot be nipped between the two faces again.

BOTH STONES RUNNING.

If stones run in reverse directions the speed of each need be only (60) half that of one stone running (120), or they can go respectively at different speeds (as 40 to 80) to make the faces pass each other at the same rate; but I know of no advantage of this arrangement to compensate for the trouble of running both stones. If both stones run one way, the practical speed of the faces is only the difference of the speed of one beyond the speed of the other, causing loss of power without corresponding advantage.

VERTICAL MILLS.

Millstones working in a vertical position would not, I should think, distribute the feed equally over the surface. One runner with two faces can do double work between two bed or fixed stones, but the two faces of the runner must be exactly parallel.

CONCLUSION.

A master miller who personally tests periodically with a circular staff, jackstick and quill, that the stones are true and in running balance, need fear no competition in manufacturing, and a journeyman who can accomplish it need never want a berth.

An upper runner is the easiest to take up and put down, is easy to drive, is the best understood, and least liable to accident; and I believe that an upper stone free to oscillate, with an inclination, or rather a powerful determination to retain its perfect horizontal position against all obstacles while running at any speed, is not to be equalled.

The introduction of the purifier for middlings has so altered the work required of a millstone, from grinding to granulating, that I believe very few millers know to what extent the millstone is capable of doing the work for the present system of milling.

I refrain from saying anything on milling in the presence of so many who understand it, and I trust that I have proved that millstones can be made to run with a perfectly true adjustable parallel space between the faces, and are capable, with suitable dress,

to do the work like rollers, besides that which rollers cannot do.

Mr. Smith, of Stone, Staffordshire, showed me last week a sample of spring American wheat, granulated at one operation through a pair of four-foot stones, in which there was, I should judge, less than 10 per cent. of flour; the semolina and middlings were excellent, the bran not smeared, but in favorable condition for subsequent treatment at the discretion of the miller, and the flour adhering was in a dry, granular state, easily removed as middlings flour. Middlings can be reduced by small millstones, or by the skirt of larger ones, with good results, and I think it will be allowed that flour may be killed by rollers.

S. S. STOUT.

H. G. UNDERWOOD.

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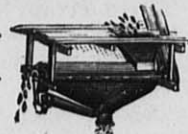
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THERE is to be a general meeting of the Millers' National Association, at the Grand Pacific Hotel, in Chicago, Ill., May 12 and 13. All members and those desiring to become members should be on hand.

WE would call particular attention to the organization of the Allied Mutual Fire Insurance Companies, lately organized in this city, for the purpose of protecting millers and manufacturers against loss or damage by fire or lightning. The Companies will be under the charge and management of S. H. Seamans, secretary and treasurer of the Millers National Association, which is a sufficient guarantee that what is done, will be well done. Mr. Seamans needs no introduction from us to the millers of the United States. We congratulate Mr. Seamans upon the favorable auspices under which his Companies enter the field.

A LETTER from an interested correspondent in India writes a glowing report concerning the Indian wheat crop, which, he says, is generally very good. Harvesting is now in progress.

MANY of our readers appear to be getting thoroughly interested in the free trade and protectionist controversy now being carried on through our columns between Mr. John W. Hinton of Milwaukee, and Mr. J. C. Bates of Chicago. Both parties are thoroughly read on the subject, and there is not the slightest personal animosity between them, but in argument they do not hesitate to hit hard. We have received several communications recently on one side or the other, from prominent manufacturing firms. We will try to find space for them next month. In the mean time, gentlemen, read and think.

MR. CLIFFORD F. HALL, editor of the *Modern Miller*, of Moline, Ill., and Miss Jennie Dunn, of the same place, were married on Wednesday, Feb. 3d, at the residence of the bride's mother. After a two-week's sojourn in Michigan, Mr. and Mrs. Hall have returned, and, just as sensible young people ought to do, have settled down to housekeeping. May good luck attend them in their journey through life, say we.

WE call the attention of advertisers to our affidavit on page 144, showing that the circulation of the UNITED STATES MILLER since January, 1880, has at no time been less than 5,000 copies per month. Aside from this affidavit our postoffice receipts, showing number of pounds of U. S. Miller mailed each month, are on file in this office, and are open to the inspection of advertisers. A large number of copies of our March and April editions will go to flour importers in foreign countries.

Two new insurance companies have been organized in Milwaukee recently, one of which is known as The Milwaukee Mutual Fire Insurance Company, and the other as The Wisconsin Mutual Fire Insurance Co.

WE are informed that R. James Abernathy has finally succumbed to the irresistible desire to "tread old fields anew," inasmuch as he is engaged in issuing the *Southwestern Miller* from Kansas City, Mo. In addition to

this it is faintly rumored that we are to have a milling paper at Jackson, Mich., and another at Duluth, Minn. Well, the more the merrier. Success attend you all, gentlemen.

THE visible supply of grain in the United States and Canada, reported by the N. Y. Produce Exchange, March 8, is as follows, in comparison with the figures given the week previous:

	Bushels.		
Wheat.....	51,377,577	Dec.	872,119
Corn.....	12,969,057	Inc.	1,465,147
Oats.....	2,023,214	Dec.	224,645
Rye.....	613,686	Dec.	56,531
Barley.....	1,255,560	Dec.	128,792

BLEACHED BARLEY.

THREE men were recently arrested in Milwaukee for selling bleached barley to maltsters and brewers. Barley which has been bleached by the sulphur or any other process is worthless for maltsters' or brewers' use, as it will not germinate. The arrested parties, (who have made considerable money by the swindle,) will be prosecuted vigorously.

THE leading business men of Hastings, Minn., are considering the organization of a wheat-buying syndicate, the object of which will be to make the prices as near as consistently can be with those in the larger markets; also the establishing of prices at which outsiders will be compelled to buy in order to protect their trade. The necessity of such a syndicate is at times sorely felt, as there is occasionally a difference of several cents between elevator prices and prices at the mills. There is also under consideration, in connection with this syndicate, the organization of a board of trade. This, it is hoped by many, will be a reality in the near future, as it will fill a want long felt.

LATEST MARKET REPORT

from Wm. Klein & Sons, London: "After two months of unprecedented stagnation, the flour trade at last shows unmistakable signs of improvement, and, though prices can not be quoted materially higher, there is more heart in the demand and dealers and bakers are wisely filling up stocks and taking hold of contracts for forward delivery. The improvement is warranted by facts, and the only wonder is that it did not come before. The supply now afloat to this country is nearly 1,000,000 quarters less than at this time last year, our stocks in granary have been largely eaten into since the beginning of last year, and the supplies from all the principal foreign sources, except perhaps India, are likely to be considerably less than usual before next harvest; Russia has no more wheat to spare, Australia and New Zealand are almost out of the field, and the bulls in America intend to corner the bears before many months are passed: the rise has been a long time coming, but the times are ripe for an advance and it cannot be distant. From trustworthy sources, we learn there are 16,000 flour mills now grinding wheat in America, and should the rumors that there is little wheat left in farmers hands, be true, this army of mills will make short work of the visible supply between this and next harvest. The prospects for a speedy and material advance are therefore bright, and buyers will do well to fill up at present low prices, there will be little chance of doing so later on.

LONDON, March 1st, 1886.

MUTUAL INSURANCE.

THE TWO NEW BUSINESS MEN'S COMPANIES PERFECT THEIR ORGANIZATION—THE OFFICERS ELECTED—PERSONAL SKETCHES—A START UNDER FAVORABLE AUSPICES.

At the office of the Daisy Roller Mills, Chamber of Commerce building, the directors of the recently organized mutual fire insurance companies met March 1st, for the purpose of electing officers and completing organization. There were present at the meeting, Francis Boyd, Fred. Vogel, Jr., Wm. Sanderson, S. H. Seamans, John M. Stowell, and C. E. Lewis, of Milwaukee; E. G. Durant, of Racine, and A. M. Bailey, La Crosse. J. M. Stowell was elected chairman, and S. H. Seamans, secretary. The by-laws, reported by the committee appointed at a previous meeting, were duly considered and adopted. An executive committee who are to have charge of the financial affairs of the companies, consisting of the president, ex-officio, Fred. Vogel, Jr., Wm. Sanderson and E. G. Durant, was elected. The term for which each director should hold office was decided by lot as follows:

For the Wisconsin Mutual—Three years: Francis Boyd, J. A. Kimberly, Fred. Vogel, Jr. Two years—E. G. Durant, Wm. Sanderson, C. E. Lewis. One year—S. H. Seamans, John M. Stowell, A. M. Bailey.

For the Milwaukee Mutual—Three years: Francis Boyd, E. P. Matthews, A. M. Bailey. Two years—E. G. Durant, J. A. Kimberly, Fred. Vogel, Jr. One year—Wm. Sanderson, S. Seamans, John M. Stowell.

The election of officers then took place. The officers of the Wisconsin Mutual Fire Insurance Company are:

President—J. A. Kimberly, Neenah.

Vice-president—Wm. Sanderson, Milwaukee.

Secretary—S. H. Seamans, Milwaukee.

Treasurer—Rudolph Nunnemacher, Milwaukee.

The officers of the Milwaukee Mutual Fire Insurance Company are:

President—Francis Boyd, Milwaukee.

Vice-president—E. G. Durant, Racine.

Secretary—S. H. Seamans, Milwaukee.

Treasurer—Rudolph Nunnemacher, Milwaukee.

The election of these officers completed the organization.

The officers in the new companies are among the most prominent business men in the Northwest. Francis Boyd, the president of the Milwaukee Mutual Insurance Company, is the active member of the old and extensive iron house of Shadbolt, Boyd & Co., of this city. Mr. Boyd is a progressive merchant of the highest integrity and of great executive ability. The organization could not have placed the supervision of its affairs in better or more competent hands. E. G. Durant, the vice president, is a prominent manufacturer of Racine, and is well and favorably known.

J. A. Kimberly, the president of the Wisconsin Mutual Insurance Company, is the head of the Kimberly & Clark Company, of Neenah and Appleton, the largest manufacturers of paper in the United States, if not the world. Mr. Kimberly, like Mr. Boyd, is a young man of the progressive stamp. For many years he has been engaged in milling at Neenah, and since its organization in 1876

he has been a member of the executive committee of the Wisconsin State Millers' Association. Wm. Sanderson, vice president, is a member of the large milling firm of E. Sanderson & Co., of this city, and is the office manager of its extensive affairs. Mr. Sanderson has been one of the prime movers in securing the organization of the two mutual companies.

Rudolph Nunnemacher, who has been made the treasurer of both companies, is the cashier, general manager and controlling owner of the Merchants' Exchange Bank, one of the largest banking institutions in this city.

S. H. Seamans, of S. H. Seamans & Co., of this city, who has been made the secretary and manager of both companies, may be considered one of the old settlers of Milwaukee, having come to this city in 1846. Since 1863 he has had the general management of the Empire Mills, lately destroyed by fire. Since 1877 Mr. Seamans has been a member of the executive committee of the Millers' National Association, and its secretary and treasurer since 1879. In this connection he has made a reputation of national importance. It is, in a great measure, to his efforts and watchfulness in its interest that the milling industry of the country has been saved many millions of dollars from unjust demands for royalties and that its patent litigations have been carried to a successful issue in the Supreme Court of the United States.

It will be the aim of the officers to conduct the business of the companies upon an economical and conservative basis. Neither the directors, presidents, vice presidents nor executive committees receive any salaries.

Policies will be issued for any number of years not exceeding five. It is preferable, however, to issue five year policies, as they can be cancelled by either party at any time, by written notice, and settlement of account. The statute limits them to \$10,000 in each company on any one risk.

Where parties insure in these companies and require more mutual insurance than their line will admit, they can place it in the best companies free of commissions.

MATTERS ABOUT TARIFF.

[Compiled for the UNITED STATES MILLER].

BY JOHN W. HINTON, OF MILWAUKEE.

Reply to a Minnesota Grain Grower in the *Milling World*:

"I would like to ask you, Mr. Editor, to point out any direct benefit which the protective tariff gives me or any other farmer in this vicinity. Free trade pamphlets are circulated among us farmers by some one, and most of them show, or try to show, that protection is against and not for the farmer. How is it?" Look at wheat for a single instance of direct benefit. You complain that the price at which it sells is too low to make its culture profitable. Do you not know that there is a tariff of 20 cents per bushel on wheat imported into this country, and that, if it were not for that tariff, wheat could be brought from India to New York and laid down in our market at 80 cents per bushel? If we admitted India wheat at 80 cents would you Minnesota wheat growers receive as much for your wheat on your farms as you now receive? Would you not receive about 20 cents less per bushel? Does not the tariff in this case directly add 20 cents to the value of every bushel of wheat you raise and sell? Don't be deceived by free trade pamphlets and free trade orators. They give only one side. They ignore truth and

facts. Protection does protect you farmers just as much as it protects the mechanics of the country. In protecting one it protects all by developing for the common benefit of all. Keep your eyes open.

The richest field in which to glean facts to sustain protective tariff is in the writings of American free traders. Thus, that free trade organ, the *Chicago Herald*, says:

The barbarous cruelty with which English administration in Ireland has kept in poverty a country which *English law robbed of her manufactures* has at last borne political fruit. Unable to find labor in Ireland, hundreds of thousands of her people have crossed into the neighboring islands in search of bread.

A ROLAND FOR AN OLIVER.

Professor W. G. Sumner, of Yale College, and an active member, in high standing, of the English Cobden Club, said recently:

"The best way to live, if you don't want to work, is to get in between two men who do work, and handle their money for them, carry goods from one to the other and levy a tax on them for the interchange of goods. The last way is that of the Protectionist."

The *Philadelphia Press* retorts with the following advice:

"A still easier way, Professor Sumner, is to get between two men who do work and get paid for telling their sons that their fathers are thieves, plunderers and pirates."

Still another way to make money, is to join the English Cobden Club, whose avowal is that they "will never rest while the United States are unsubdued," retain your position as Professor of Political Economy, in an American college, draw a big salary, neglect the duties of that position, while advancing English interests, denouncing American interests, until the college is so run down that people have lost all confidence in that college and in its professor too.

An exchange has the following:

"Believers in American systems and institutions will be gratified to learn that Yale College is no longer a purely British institution, devoted to the teachings of English snobbery in manners and English free trade in commerce. Under the unrestrained free trade crankism of Professor Sumner, Yale was simply an un-American college, and that fact was becoming so widely known that it began to injure the standing of the college in the great manufacturing States from which many of its students are drawn. It has been openly asserted that the only way open to the managers was to dismiss Professor Sumner, but a sort of compromise has been effected in the engagement of Professor Robert Ellis Thompson, of the University of Pennsylvania, to deliver to the students of Yale College a series of lectures on the protective tariff system. This is only a half-way arrangement. If Yale is to be an English institution, the fact should be known to all Americans so that they may understand that in supporting Yale they are supporting an establishment whose graduates are sent out with ideas largely foreign and totally unfit to be held by American citizens."

We will send St. Nicholas Magazine and the U. S. Miller for one year for \$3.60.

"MR. SNAGGS, the next time you go Pittsburgh you must get me a temporary ban for Fido," said Mrs. Snaggs yesterday morning.

"A temporary ban!" snorted Snaggs, "what in the name of sense is a temporary ban?"

"I don't know, but I see that the dogs in New York are being put under a temporary ban, and I suppose its the latest style of dog blanket for the winter, you know."—*Pittsburgh Chronicle*.

[Written for the UNITED STATES MILLER.]

"RELIGIOUS (?) ASPECTS" OF A FRAUDULENT TARIFF.A REPLY TO JOHN W. HINTON, IN FEBRUARY NUMBER.
BY J. C. BATES, OF CHICAGO.

Artemus Ward was wont to remark in reference to his Kangaroo, that "he was an amooosin cuss." The same remark may apply to the average "Protectionist" of the present day. He is one who has an axe to grind, and for that reason compels the poor consumer to turn the grindstone for him; and you may be sure will endeavor to keep the consumer nose very close to the stone! Mr. John W. Hinton, in a lecture at Rockford, not long since, in enumerating some of the enjoyments which the people of this country might have while being plundered by his Constitutional-religious method of tariff, said: "A protective [i.e. high] tariff stands at the elbow of every laboring man in this country, to help him to better wages, to a more independent position and to a higher development of his faculties. It is a refuge for his weakness and a bulwark for his strength. It is also a fact, that in replying to my communication in the UNITED STATES MILLER, combating his views, he dates his letter "North-western Tariff Bureau," implying thereby that he speaks by the book and represents the views of our present masters and owners, the moneyed monopolists, whose organization to prevent a revision of the tariff extends to every nook and corner of the United States. He may or may not derive any pecuniary benefit therefrom. I hope, for his own sake, that he will be able to say that he does not. Possibly the Northwestern Tariff Bureau is an auxiliary of the Industrial League of Philadelphia, of which Mr. Wharton Barker is the backer and mouth-piece. Let any movement be undertaken anywhere in the United States, for the liberation of trade from the fetters which now bind it, and the Industrial League and Mr. Barker are on hand like a picked-up dinner. It is alike significant, Mr. Hinton's apparent connection (I say "apparent," for I do not know that it is actual) with the Tariff Bureau, and his extensive knowledge of Hon. W. D. Kelly, the very kingpin of the high tariff machine, and Mr. Kelly being so thoroughly endorsed by him may be considered a competent witness for me to use, later on, to show why we can have no extended foreign demand for manufactures under our present tariff. Let me preface what I have to say in reply to Mr. Hinton, by a brief review of the tariff question. Granting, for arguments sake and to save controversy, that all of our present tariff was contained in the decalogue, the Declaration of Independence, the Constitution of the United States and the Fifteenth Amendment, let us get directly at the business in hand. Let us take as a starting point the beginning of our civil war. The tariff, from 1846 to 1860, was satisfactory generally. When the Morrill bill, which forshadowed the tariff policy of the Republican party was brought forward in 1861, there was strong opposition to it, especially on the part of New England manufacturers. This tariff advanced the duties considerably. It was in fact a step to attach Pennsylvania, Buchanan's state, to the Republican party. It raised the duty on iron, which tickled the Pennsylvanians. Other duties were, however, still moderate. Civil war began a little later,

caused the piling of duty on duty, which resulted in what we now have. The changes in tariff became a necessary part of our financial system, a temporary expedient to bridge over the exigencies of the war. Paper money was issued and an internal tax system put in operation to raise the needed revenue. Thus this process of increase begun in 1861, was further increased in 1862, and reached its climax in 1864. The urgency of the situation left the solution of government financial questions with those immediately charged therewith. There was no public expression or opportunity for it. It was thus that the theories of extreme ideas went into operation. About everybody who applied to have a duty levied succeeded. The result was a tariff of the most extraordinary character. Duties were then imposed which otherwise would never have been considered for a moment. This tariff of 1864 was in force until 1883, when the tariff act was passed, but the changes in that were so slight that we still have practically the war tariff of 1864, a war measure, now in operation. The other war measures, internal taxes and irredeemable paper money, were swept aside in 1872, and the only feature, aside from our tariff, still remaining in our financial system is the internal taxes upon such things as distilled spirits and tobacco, which very properly have been retained. Ever since 1870, again and again have demands been made of Congress to reduce the tariff and rid it of at least some of its crudities and glaring imperfections. But some "Bureau" or "League" has always been able to "see" somebody about it in advance. When the matter came up in 1867, it was put off "until the next session." In 1872, duties were reduced ten per cent. only to be repealed and put back at the old figure in 1875. As, under the Constitution, the power to deal with all matters of revenue are vested in Congress, it is all important that opponents of the existing piratical methods vote only for congressional candidates pledged to reform; and whenever a U. S. Senator is to be chosen from their state, to see to it that all candidates for the state legislature, representative and senatorial, are also thus pledged.

I am asked by Mr. Hinton to "name some articles on which the duty is so high that it prohibits importation. There is quite a list, but a few might suffice:

1. Ships and other tonnage.
2. Steel rails.
3. Copper.
4. Pig Iron.
5. Blankets.
6. Nickel.
7. Quicksilver.
8. Marble.

Ships are prohibited, i.e. an American cannot obtain a United States register for a foreign built vessel. The duty on all the other articles, except marble, is for the purpose of keeping them out. A duty of 75 to 100 per cent. is piled upon marble thus enabling the tariff not only to relentlessly pursue a man through life, but to his grave. Quicksilver is produced only in California, and nickel only in a single mine. The effect of such prohibitory legislation is to rob the public to enrich the few.

The duty on steel rails was fixed at \$28 per ton, or about 100 per cent. on the value at the time. Bessemer steel was a monopoly

in control of some dozen companies, whose enormous profits have reached some 200 per cent. Such profit was made possible only by the prohibitory duty. How did it operate? Just as in every other case of extortion, the manufacturers overreached themselves. Having killed the home trade, and not having any foreign demand, they had to contract their business by discharging their workmen. Copper is another instance of keeping the home market dear in order to sell cheap in the foreign market. The duty is sufficient to keep foreign copper out. The duty on pig iron has the same effect, and the same is true of the duty on blankets. This latter (blankets) however, brings up the matter of wool and woolens. The farcical action of the tariff commission is still fresh in the minds of many manufacturers, claimed to use about four pounds of wool to make one pound of cloth. Wool growers wanted a duty of 11½ or 12 cents duty on the pound. The manufacturer said the duty should be 7½ cents and the duty on a pound of woolen cloth 46 cents. But as their oils were taxed they must be put in as good position as the wool growers, and required a duty of 50 cents on woolen goods. Besides, they wanted assistance from the government of about 25 per cent. and then Internal Revenue and license tax would swell the amount ten per cent. more. They obtained what they demanded! Congress accepted their dictation without qualification. The result, a duty of 60 to 100 per cent. has brought vast burdens upon the people.

Mr. Hinton would give the public to understand that, in spite of all this taxation, clothing is cheaper here than in England, that certain other manufactures are also very much cheaper here than in England or elsewhere. I will simply content myself by inquiring, if this is so, why, in the name of all that is good and progressive, don't our manufacturers ship to England or start out and find a foreign market, or why, if their goods are cheaper than foreign manufacture, do they fear competition in their own markets? The Hon. W. D. Kelly, whom he has so strongly endorsed, shall answer for him. Mr. Kelly says, substantially, that having heard a great deal about our exports of manufactured goods, when convenience afforded opportunity he investigated the causes, only to find that our merchants, instead of further depressing the home market, the best in the world, preferred making their losses abroad. That these goods, except in times of great commercial depressions, rarely went abroad. And that as soon as the peculiar circumstances which gave rise to such exports will change, the home market occupied the exclusive attention of the manufacturers. Such is the testimony of "a recognized authority." And yet the cotton manufacturer will tell you that, except upon their finer fabrics, they are indifferent about protection. The manufacturer of woolens does not hesitate to express his ability to hold his own against the world if he can have free wool. Give him free wool and he will be a bigger customer for domestic wool than ever before.

I referred in my previous article, to the tariff making the farmer, stock raiser and mechanic pay more for their coal, sugar and clothing. Says Mr. Hinton, in reply: "It would be difficult to crowd more loons into the same space," and goes on to tell about

cost of those things in England. The comparison is his, not mine. As to the cost in the United States, is there not a duty on coal, sugar and clothing? Does not the duty add to the cost? Does the gentleman not know that there is a rebate of between two cents and three cents per pound on every pound of sugar exported, and that the British grocer pays our refiner just that much less per pound than the American grocer has to pay for the same sugar, and all because there is a little sugar patch in Louisiana, a very important bob, however, to the high tariff kite, though by reason of occasional frosts, the sugar interests there are, and ever have been, precarious. And just here I would remark that in all this time this war tariff has been in operation this country has paid millions upon millions of dollars to the Spanish West India Islands; their best customers in fact, while in return for this enormous trade our producers and manufacturers have, by failure of this government to care for their interests in foreign countries, been vigorously excluded from those markets. Hence the reason why our farmers, producers, millers and manufacturers generally, should insist that their government shall do for them just what the government of Great Britain does for its producers and manufacturers—negotiate commercial treaties. The most favored nation clause, namely, that our country is entitled to receive all accorded to the most favored nation, exists in all our treaties, and if our government insists upon it the people of this country can have all the advantages accorded to the people of any other nationality. It will be found, however, that high tariff men are as afraid of commercial treaties as his Satanic Majesty is said to be of holy water.

The report of the late consul at Liverpool is fully accounted for by the explanation by Mr. Kelly to which I have already referred. It must be remembered also that certain of our manufacturers are protected by patents in England as well as in the United States. It will be noticed that the ex-consul's quotations for the cheapest mower at a certain agricultural fair he attended was *in francs*, showing plainly that the locality was in high tariff France and not in free trade England as he would have the reader infer. Said Mr. Hinton in his lecture, speaking enthusiastically, "France maintains its high protective tariff, and, while I am speaking, is about passing stringent corn laws. Political economy is studied and tested and not swallowed by Frenchmen."

Surely, then, here must be a haven for the workingman! Here then must be a country, above all others, where a high tariff "stands at the elbow of the workingman to help him, etc," where "it is a refuge for his weakness and a bulwark for his strength!" But what are the facts? I will let that "protection" sheet, the "Milling World" of January 11, 1886, tell just how that tariff works in France. That paper says: "Labor was never more distressed in France than it is to-day. Thousands are entirely out of work and common laborers are glad to get employment at 30 to 40 cents a day, while skilled carpenters and blacksmiths and masons make only from three to four francs, which is 60 to 80 cents a day." So much for "protection" which a high tariff affords to the laboring man in France. Let us turn for a moment

and see how such tariff helps the laboring man in America. Let us glance at the latest phase of labor troubles here, the difficulties in the coke regions.

In January a small army of deputy sheriffs, policemen, with a militia reserve, were engaged in discussing whether a couple of thousand of workingmen should buy their brogans and bacon at company stores, at the old rate of wages, or get 10 per cent. more and buy where they pleased. It was compromised by conceding the ten per cent. demanded, but purchases were still to be made at the company "Pluck me" stores. And then the company stores immediately advanced their prices ten per cent!

Now coke making is an industry which has prospered wonderfully, increasing from four coke works in 1850 to twenty-five in 1870, until now there are two hundred and fifty coke works with nearly twenty thousand ovens. But how has it benefited the laboring man? The inventor of the process, who was a mechanic, is still living a poor man, while the operatives at the works are in penury and want. They drove out American labor by cheap imported labor from Europe. These importations (for the tariff affords no protection to labor) were made for the express purpose of depressing labor.

The rioters were described as "Hungarians," when in fact a large portion were Bulgarians, who, men and women, half naked, worked together for a pittance. Uncontrollable, ignorant and vindictive, imported here to be ruled, they concluded to rule. Hence the riot. Poles succeeded these, and just now the coke regions are importing negroes from Virginia to work their ovens, under the belief that they are more docile and will work cheaply. It so happened during the troubles in the coke regions that fifteen or twenty of the strikers were arrested. Now these "American workingmen" with the tariff at their elbow to help him, were no sooner arrested than they applied to the Austro-Hungarian Consul at Pittsburg for relief and he hastened to their side.

Let me refer to one other protected industry, the manufacture of jute. California having to dispense with Coolie labor sent agents to Europe and imported a large number of young women to operate their jute mills. The duty on foreign manufactures of jute under our tariff is from 35 to 40 per cent. And for whose benefit? Every manufacturer of the article will assert positively that it is for the protection of American labor, and that they cannot compete successfully with foreign manufacturers, except they grind their labor to the prices of the "pauper labor" of Europe.

And yet we are told by the gentleman who dates his correspondence, and presumably at his *place of business*, the "Northwestern Tariff Bureau," that our tariff "stands at the elbow of every laboring man to help him to better wages and a more independent position." Does he desire authoritative information as to why more mowers and agricultural implements are not exported? Mr. Averill, superintendent of the now closed McCormick works here shall answer. Says Mr. Averill: "Work is so light this year. This has been a light year for all kinds of machines. I attribute this dullness to the fact that we have no foreign market for our home product."

The same individual, in his lecture at Rockford, stated, "So-called free trade, which nowhere exists to-day and never has existed anywhere." In his reply, however, to my criticisms, he says: "Ireland has free trade and want that beggars description." Will he kindly explain wherein the tariff of Great Britain operates differently in Ireland than in England and Scotland? But he goes on to say every time the American people have tried free trade or a very low tariff, they have miserably failed and have never been equal to the opportunity." Here then we see "Free trade nowhere exists and never has existed anywhere. 'Ireland has free trade!' 'America has had free trade!'"

It certainly is in order for the gentleman of the "Northwestern Tariff Bureau" to explain, for, from the above, it would seem, that he must be either "strayed or lost."

The free traders of this country are not idiots. There must be a revenue to meet the expenses of government, and they would think that man a crank who would advise differently. This revenue may be raised by a tax on importations of luxuries or by any other practical method. Doubtless the people of this country would be very well satisfied with the tariff which preceded the war. Certainly free traders would not ask for anything more liberal than now prevails in Great Britain, which according to Mr. Hinton, is a tariff country. Her customs tariff however, is levied mainly on such articles as wines, spirits, drugs, tobacco, etc.

It is well known that the lecturer's protection friends in England are laboring against the free importations of American produce. But as it takes more labor to convert flour into bread than wheat into flour, the English bakers will continue to buy the best flour at the cheapest price, it matters not where it is from, and the cheaper they buy the cheaper the English laboring man will get his daily bread. Does the British miller himself ask any protection against his American competitor? On the contrary, he is confident of his ability to compete with anybody without artificial props. They have the wheat of the world from which to select their varieties.

The avowed purpose of Cobden and his associates was to make England the workshop of the world, permitting other countries to furnish her food and raw material without duty, cheapening alike the cost of material to be manufactured and the living expenses of her workmen. She took her free trade in five great installments beginning some forty years ago and ending in 1866, each step demonstrating conclusively the steady advance of her commerce and manufactures.

In the face of these facts, the frequent assertion of high tariff men that freedom is not compatible with improvement and advancement has a strange sound in this America of ours. It is not alone assertion, but assertion that is followed by compulsion. The American farmer is not permitted to sell in the highest markets but compelled to sell in the lowest, the laborer is defrauded, and it is not impossible, if the thing is allowed to go on, to further diminish personal freedom. Let us not forget that we have a tariff of more remarkable character than that which any other nation has at the present time. The countries against which our

tariff has discriminated have discriminated against us in turn and shut us out from their markets.

And where diplomacy has not shut us out our prices being higher have accomplished that result. This is the case right at our own doors in South America. If Chilians, Peruvians, Brazilians and Mexicans have been able to buy to better advantage elsewhere in the past, it ought to be so no longer. If they can buy of us what they want, cheaper than they now buy from the English, French and Germans, they will certainly do so. It is simply a delusion to suppose that these nations have any particular affection with the countries of Europe that they prefer to trade there. They simply prefer to buy in the cheapest markets of the world, and the Spanish-American countries, including the West Indies, have a population nearly equaling that of the United States. Our policy, therefore, has for the past quarter of a century been that of new intercourse. This policy not only destroyed our legitimate foreign trade in manufactures and caused the American flag, which formerly waved wherever shipping whitened foreign seas, but has also killed off commercial enterprise. Any nation to be great must be great also upon the seas. American merchants and seamen once had the lead. The Confederate cruisers did fearful damage to our merchant marine, but it will not compare with the still greater and almost irreparable injury inflicted upon it by that piratical tariff. Mr. Hinton speaks of the tariff as "our American labor king." Yes, and never was king more despotic. I prefer to agree with Solon Chase's saying, "In America, labor is king, or rather should be or shall be king." The people are sovereign. They have decreed, (having submitted to be robbed about as long as they intend to) that the war tariff and all who uphold it must go. *Down then with tariff monopolies! Up with the rights of the people.*

NEWS.

S. POWERS, Madisonville, Ky., has sold out.

JOSHUA GILGER, of Hadley, Pa., has sold his mill.

THE mill at Brownstown, Ill., was recently burned.

DISSOLVED—Wright, Anderson & Co., of Sheldon, Mo.

GEO. J. MENZLER, Lynchburg, O., miller, has sold out.

H. ROGERS, miller, Trenton, Tenn., has sold his mill.

BURNED—Hamberger & Stafford's mill, at Barnesville, Ga.

S. T. & J. H. WARE succeed Danner Bros. at Quitman, Mo.

J. M. CONN & Co., Franklin, Ky., have dissolved partnership.

FARMERS about Redfield, Dak., began to sow wheat a week ago.

HENRY MESTERMEIER, the miller at Pacific, Mo., has sold out.

GREEN, GOLD & Co., of Faribault, Minn., have made an assignment.

THE mill of I. C. Booher, at Ryerson's Station, Pa., has been burned.

THE Valley Milling Co. has been chartered at Irene, Kan. Capital, \$10,000.

JOHN ADAMS will soon build a 60 bbl. all roller mill near Willmar, Minn.

JAMES BERRY, of the milling firm of Berry & Foote, Adrian, Mich., is dead.

ON March 1 there was in store at Duluth, Minn., about 81,000 bbls. of flour.

MESSRS. BLAKER & Co. are building a new roller mill at Pleasanton, Kan.

J. SPENDLER, miller at Woodland, Mich., has been succeeded by Snow Bros.

MARCH 4, Merman's mill at St. Louis was burned. Loss, \$15,000; partially insured.

THE firm of Davenport, Son & Draper, at Freeman, Mo., is now known as J. S. Parish & Son.

THE milling firm of La Turno & Drace, at Armstrong, Mo., is succeeded by W. G. Drace.

THE P. H. Postel Milling Co., at Mascoutah, Ill., has been incorporated, with \$100,000 capital stock.

THE mill of Wm. Evans & Son, Romansville, Pa., has been burnt out. Loss, \$6,000; insurance, \$3,000.

WORK has been commenced upon a mill at Carrington, Kan., by Nelson & Calkins. Capacity not stated.

JOHN B. GRIFFIN, owner of the Erie and Queen City mills, at Buffalo, N. Y., died Feb. 27, aged 58 years.

I. M. LOESER, of the firm of Loeser, Clark & Co., at Cuyahoga Falls, O., has made an individual assignment.

A saw and grist mill at Wymansville, Ind., owned by Tobroke & Aldenhagen, has been burned. No insurance.

THE large mill at Glasgow, Scotland, owned by the Bakers' Union of that place, burned Feb. 6. Loss over \$25,000.

THE Rising Star Mills, of Walla Walla, Wash. Ter., owned by A. McKinnon, have recently been re-fitted to the roller system.

IT is reported from many sources that the Nurdyke & Marmon Co., of Indianapolis, are doing a great deal of good business.

Low water in the Delaware river has been the cause of the shutting down of many mills and factories at Camden, N. J.

MILLING business is good at Leavenworth, Kan. Both mills at that place were unable to supply the demand the past year.

THE Phoenix Wire and Iron Works, of Detroit, Mich., inform us they are now promptly filling all orders received by them.

HUBINGER BROS.' mill, at Frankenmuth, Mich., was recently damaged by fire to the extent of about \$8,000. Partially insured.

NEW ULM parties have let a contract to build a 150 bbl. roller mill at Springfield, Minn. The firm will be known as the Springfield Mill Co.

Valier & Spies, Marine, Ill., are putting in one pair of rolls, with patent automatic feed, furnished by the Case Mfg. Co., Columbus, O.

The Canon City Milling Co., Canon City, Col., are putting in one improved centrifugal reel, furnished by the Case Mfg. Co., Columbus, O.

A. L. Strong & Co., Omaha, Neb., have placed an order with the Case Mfg. Co., Columbus, O., for seven pairs of rolls, purifiers, scalpels, etc.

E. J. SWEET, of Florence has bought the old buhr mill and water power at that place, and will rebuild and remodel it to the roller system.

THE receipts of flour in Montreal for the year 1885 were 800,788 bbls., against 1,152,789 bbls. for the year previous, showing an important decrease of 352,001 bbls.

EVERETT & AUGHENBAUGH, millers, of Wasega, Minn., are being boycotted by the farmers of the vicinity because they would not pay higher prices for wheat.

THE failure of the Thomas Bradford Co. in no way effects the solvency of the old Bradford Mill Co., of Cincinnati, which is an entirely separate and distinct concern.

S. M. Canan, Richwood, O., has placed an order with the Case Mfg. Co., Columbus, O., for one pair of rolls, with patent automatic feed, and one improved centrifugal reel.

Wm. Mitchell & Sons, Detroit, Mich., have placed their order with the Case Mfg. Co., Columbus, O., for all necessary machinery for a roller cornmeal mill on the Case system.

A. H. Fairchild & Son, North Bloomfield, N. Y., have placed an order with the Case Mfg. Co., Columbus, O., for a No. 1 double purifier, to be shipped to B. D. Woodruff, Livonia Station, N. Y.

THE Case Mfg. Co., Columbus, O., have secured the contract of Thomas T. Hoffman, Bloomsbury, N. J.,

for a complete outfit of rolls and other machinery for a full roller mill on the Case system.

LAST Saturday, at the Pettit mill, Minneapolis, Minn., a six foot pulley, weighing 3,400 pounds, flew into numerous fragments, and went crashing through the mill, regardless of consequences. No one injured.

The Case Mfg. Co., Columbus, O., have secured the contract of Wm. Wallace, Lafayette, Ind., for a complete outfit of rolls, purifiers, centrifugal reels, bolting reels, and all necessary machinery and appliances for a roller mill, on the Case system, to be built at Dale, Ind.

THE firm heretofore known as Shumaker & Porter, Silver Creek, N. Y., manufacturers of the Silver Creek cornmeal refiner and other milling specialties, has been dissolved by mutual consent. Mr. Porter's interest and good will in the business will hereafter be controlled by Mr. John T. Shumaker, brother of the senior member of the late firm. The new concern will go under the firm name of Shumaker Bros. Mfg. Co., and will collect all bills and assume all indebtedness of the late firm of Shumaker & Porter.

A FIRST-CLASS barreling establishment is needed at Duluth, to transfer flour received there from country mills in sacks to barrels for shipment thence to eastern and foreign markets. The sacks could then be returned to the mills, which are mostly in a prairie country, and again filled for shipment by rail to Duluth. A barrel factory is also needed. Both of the above institutions must be provided at an early day, to meet the rapidly increasing demand of millers in northwestern Minnesota and Dakota.

A FIRE broke out in the immense mills of Ferdinand Schumacher, in Akron, O., about 2:10 o'clock on the morning of March 6. The flames were first discovered in the dry-house, a new five-story brick building on South Broadway. The dry-house was filled with the best of wheat, and there were numerous dust-shafts leading from this structure to the "German C" mill, an immense seven-story brick in the rear of the dry-house and fronting on Mill street. Before the fire department had responded to the alarm, the flames swept through these flues, and soon the fire was issuing from the handsome new structure. Although nothing definite can be learned at this time, the loss is estimated at \$1,000,000. Mr. Schumacher carried an insurance of \$150,000.

E. P. ALLIS & Co., of Milwaukee, have broken ground for a wheat elevator, to be used in connection with their new model mill on Washington street. It will be located just east of the mill building. The dimensions are to be 30x40 feet on the ground, with a height of five stories. The estimated capacity of the structure is between 35,000 and 40,000 bushels. A space of sixteen feet between the elevator and the mill will be used for wheat cleaning purposes. Wheat is to be taken into the elevator from cars and bulk wagons. A steam driver is already on the ground and the work of driving piles for a firm foundation is being vigorously prosecuted. The mill is to be devoted exclusively to the manufacture of export flour, and the grinding will be done by thirty-nine Gray roller machines of various sizes, geared so as to attain a high rate of speed. The addition of one story to the mill will accommodate shafting for operating the elevator.

The Case Mfg. Co., Columbus, O., have an order from Mutchner, Higgins & Co., Indianapolis, Ind., for two cornmeal aspirators and purifiers; an additional order from Roots & Co., Cincinnati, O., for two pair rolls, with patent automatic feed; from the Export Milling Co., Greenville, Ill., for one pair of rolls, with patent automatic feed; from A. L. Strong Co., Omaha, Neb., for one single reel bolting chest, to be placed in the mill of Fry & Gayson, Stanton, Neb.; from D. S. Shellabarger & Co., Decatur, Ill., for two pairs of rolls, with patent automatic feed; are furnishing Rice & McCampbell Bros., Chrisman, Ill., with all the necessary machinery for a roller cornmeal mill on the Case system; from W. T. Pyne, Louisville, Ky., for one pair rolls, with automatic feed rolls, to be placed in the mill of S. H. Matthews, Tunnelton, Ind.; from A. L. Strong Co., Omaha, Neb., for six pairs of rolls, purifiers, scalpels, etc., for the mill they are building for E. B. Welch, Fairmount, Neb.; from Kerfoot Bros., Des Moines, Iowa, for four pairs of rolls, to be shipped to Webster City, Iowa.

We will send The Milling World (weekly) and the U. S. Miller for one year for \$2.00.

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A Remarkable Coincidence.—While the new Furnace was in process of construction, the editors and publishers of Webster's Unabridged were engaged upon their new work which is as great an improvement upon all previous Dictionary productions, and just as valuable in its way as is the incredible fuel economizer above alluded to. Webster's Practical is not only a new compilation by the leading Dictionary House of the world, but it embodies several new features which, for ordinary use, render it pre-eminent among dictionaries—not excepting even the Unabridged.

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The following paragraph is reproduced from Webster's Practical.

Book, book, n. A collection of sheets of paper, etc., bound together; a literary composition, written or printed; a subdivision of a literary work. (*Mer.*) A volume in which accounts are kept. — *v. t.* [booken (bookt), book(s).] To enter, or register in a book. — **Book'ish, a.** Given to reading; more acquainted with books than with men. — **Book'-bind'er, n.** One who binds books. — **bind'ery, n.** A place for binding, etc. — **blind'ing, n.** A practice of, etc. — **case, n.** A case with shelves for holding books. (*Bind.*) A book-cover. — **cover, n.** (*Bind.*) A case for a book; a cover of cloth or other material prepared for casing a book. — **keeper, n.** One who keeps accounts. — **keep'ing, n.** Art of recording mercantile transactions and keeping accounts. — **learned, -lernd, a.** Versed in books; ignorant of life. — **learn'ing, n.** Learning acquired by reading; esp. as opp. to practical knowledge. — **mak'er, n.** One who writes and publishes books; a compiler; a sporting man who makes a record of bets. — **mak'ing, n.** The practice of, etc. — **compilation; systematized betting.** — **mark, n.** Something placed in a book by which to find a particular place. — **plate, n.** A label indicating ownership, place in a library, etc., usually on the inside of the cover of a book. — **post, n.** The post-office arrangement by which books are mailed. — **sell'er, n.** One who sells books. — **shelf, n.** A shelf to hold books. — **shop, -stall, -store, n.** A place for selling books. — **stand, n.** A stand for selling books in the street; book-stall; a support to hold books. — **worm, n.** A worm or mite that eats holes in books; one excessively addicted to study.

THE QUANTITY TEST.

(The following exhibits are from the texts of the dictionaries named.)

Webster's Practical Dictionary, (\$1) 600,000 Words and 1,400 Illustrations.
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MILWAUKEE, MARCH, 1886.

ANNOUNCEMENT:

WM. DUNHAM, Editor of "The Miller," 69 Mark Lane, and HENRY F. GILLIG & Co., 449 Strand, London, England, are authorized to receive subscriptions for the UNITED STATES MILLER.

We send out monthly a large number of sample copies of the UNITED STATES MILLER to millers who are not subscribers. We wish them to consider the receipt of a sample copy as a cordial invitation to them to become regular subscribers. Send us One Dollar in money or stamps, and we will send THE UNITED STATES MILLER to you for one year. SEE COMBINATION OFFER ON OTHER PAGES.

The United States Consuls in various parts of the world who receive this paper, will please oblige the publishers and manufacturers advertising therein, by placing it in their offices, where it can be seen by those parties seeking such information as it may contain. We shall be highly gratified to receive communications for publication from Consuls or Consular Agents everywhere, and we believe that such letters will be read with interest, and will be highly appreciated.

TO ADVERTISERS.

Milwaukee, Wis., March 1, 1886.

To Those Interested in the Flouring Trade:

THE UNITED STATES MILLER is now in its tenth year, and is a thoroughly established and much valued trade paper. It has a large regular list of domestic and foreign subscribers. It is sent monthly to United States Consuls in foreign countries, to be filed in their offices for inspection by visitors. It is on file with the Secretaries of American and European Boards of Trade for inspection of members. Aside from the above, thousands of SAMPLE COPIES are sent out every month to flour mill owners who are not subscribers, for the purpose of inducing them to become regular subscribers, and for the benefit of those advertising in our columns. Every copy is mailed in a separate wrapper. Our editions have not been at any time since January, 1880, less than 5,100 COPIES each, and are frequently in excess of that. We honestly believe that the advertising columns of the UNITED STATES MILLER will bring you greater returns in proportion to the amount of money invested than any other milling paper published. Advertisers that have tried our paper for even a few months have invariably expressed themselves well satisfied with the results. Our advertising rates are reasonable. Send for estimates, stating space needed. The subscription price of the paper with premium is One Dollar per year. Sample copy sent free when requested. We respectfully invite you to favor us with your patronage. We shall be pleased to receive copies of your catalogues, and also trades items for publication free of charge. Trusting that we may soon be favored with your orders, we are,

Yours truly,

UNITED STATES MILLER.

E. HARRISON CAWKER, Publisher.

Affidavit Concerning Circulation.

STATE OF WISCONSIN.

MILWAUKEE COUNTY.

E. HARRISON CAWKER, editor and publisher of the UNITED STATES MILLER, a paper published in the interest of the FLOURING INDUSTRY, at No. 124 Grand Avenue, in the City of Milwaukee, and State of Wisconsin, being duly sworn, deposes and says that the circulation of said paper has at no time since January, 1880, been less than FIVE THOUSAND (5,000) copies per month; further, that it is his intention that it shall not in the future be less than FIVE THOUSAND copies each and every month.

E. HARRISON CAWKER,

Publisher.

Sworn to and Subscribed before me at Milwaukee, Wis., this 15th day of March, A. D. 1886.

ISAAC S. CLARK,
Notary Public.

VERY few of the reports from the winter wheat sections indicate serious damage to the grain. The total of frost-killing thus far is insignificant and most of the grain is in excellent condition.

We will send the U. S. Miller for one year and Ropp's Calculator for \$1.00.

FROM all accounts we judge that the state of trade generally among mill furnishers is not what was almost expected by this time, but, although there are more or less complaints, no one seems to be very keenly disappointed. We trust that in a few months more we may see a very general revival of trade, not only among the mill-furnishers, mill-builders and millers, but in all other lines of trade.

We will send The Milling World (weekly) and the U. S. Miller for one year for \$2.00.

BOYCOTTING is not confined to our own country. February 14, 1882, at London, England, Lord Salisbury addressing a meeting convened in behalf of English woolen industries, said: "Under our present circumstances it is a matter of national interest that purchasers of textile fabrics should as far as possible give preference to goods of British make."

We will send the Deutsch-Amerikanische Mueller and the U. S. Miller for one year for \$1.50.

We beg our readers to excuse the extreme lateness of the issue of our March number. The reason is that the editor has been afflicted, as the Irishman said, with a "mortal sickness." Although not so bad as that, we are thankful to say that we have recovered sufficiently to do a pretty fair day's work, and we trust our readers and correspondents, many of whom have been sadly neglected, will accept our excuse for apparent neglect. In a few days the accumulations of three weeks, we trust, will be worked off.

We will send St. Nicholas Magazine and the U. S. Miller for one year for \$3.60.

THE population of Chicago is thus noted:

Year.	Population.	Average p. c.
1835.....	3,265
1840.....	4,480	6.5
1845.....	12,100	22.0
1850.....	28,300	17.4
1855.....	80,000	23.1
1860.....	109,200	6.4
1865.....	178,500	10.3
1870.....	306,600	11.5
1875.....	401,500	5.5
1880.....	503,300	4.6
1885.....	667,900	5.8

We will send the U. S. Miller and The Milling Engineer for one year for \$2.00.

OUT of a total population of 27,000,000, the farming population of Japan numbers 15,000,000. During the past ten years the improved breeds of horses, cattle and sheep have been introduced with good results. The farmers live principally upon cereals and fruits. Oats, corn, barley, wheat and rye are the chief grains produced, rice of course being the largest.

THE United States appropriate less for agricultural purposes than any other country, Switzerland excepted. France annually appropriated \$20,000,000; Brazil, \$12,000,000; Russia, \$11,000,000; Austria, \$5,500,000; Great Britain, \$795,000; Japan, \$1,000,000; Switzerland, \$142,000; and the United States \$652,000.

We will send the U. S. Miller for one year and Ogilvie's Handy Book for \$1.00.

THE editor of a certain milling paper not long since in conversation said: "There are too d—n many milling papers, and about half of them have got to be sat down on." If the aforesaid editor does sit down on any of them, we will wager a brand new hat that he will be glad to get up mighty quick. So mote it be. If he really thinks there are too many, let him throw up his own first.

Now is your time to send in your subscriptions for milling papers and other periodicals. Read our Club List on another page.

A Tale of Nine Cities

Is the euphonious title of a little book giving a brief description of the points of interest in the nine principal cities of the great Northwest and Far West, viz: Chicago, Milwaukee, St. Paul, Minneapolis, Council Bluffs, Omaha, Denver, San Francisco and Portland, Oregon. A correct colored map of each city is made a part of this instructive book, which is being distributed by the Chicago, Milwaukee & St. Paul Railway.

For a free copy, address A. V. H. Carpenter, General Passenger Agent, Milwaukee, Wis.

STRENGTH OF THE KNIGHTS OF LABOR.

In speaking of the great strike now going on, and extending from St. Louis to the Gulf of Mexico, the St. Louis Globe-Democrat says: "It is ascertained from the most reliable sources that District Assembly No. 17, with headquarters in this city, has a membership of from 12,000 to 15,000, and within a radius of 300 miles are about 50,000 Knights of Labor. Altogether in the country there are, counting some newly organized assemblies, about 160 district assemblies, some of which are very strong, numerically considered. Some of the district assemblies in the manufacturing districts of the East count up fully 50,000 members, and of the total membership of the order various estimates are given, ranging from 500,000 to 1,500,000. In close connection with the Knights of Labor in this city is the International Working People's Association, which will give the Knights of Labor their moral support, and, if necessary, material aid. Both organizations are said to be in close communion, and will act in concert in any emergency that may arise. The numerical strength of the International Working People's Association has been greatly underestimated, from the fact that they do not care to let their exact number be known. In the various groups of the order are included something like 10,000 members in this state and Illinois alone. In this city and close vicinity are probably 20,000 men who are members of organizations directly upholding the strikers of District Assembly No. 101.

GEO. T. SMITH'S RECENT UNPLEASANT EXPERIENCE.

Concerning the arrest of Mr. Geo. T. Smith at Toronto, on Wednesday last, we find the following in the *Detroit Free Press* of the 19th inst.:

"There are few if any men in the state of Michigan more widely known than George T. Smith, of Jackson. In his manufacturing establishments in Michigan and Canada he employs over 700 men, and the product of his workshops is known in all civilized quarters of the globe where wheat is ground into flour. It is not, therefore, greatly to be wondered at if a good deal of excitement is caused when such a prominent man is arrested on the charge of perjury. W. J. Kinmont, of the Union mill, Detroit, was called to Toronto last Wednesday when Mr. Smith was arrested, and returned home on Friday, after the examination before the Toronto police justice had been completed.

"The story of the trouble between Mr. Smith and Benjamin Barter is a rather long one," said Mr. Kinmont to a reporter of the *Free Press*. "Away back in 1871 a Frenchman named La Croix got the idea of a purifier out of a French book and tried to make it work. He failed in this and finally threw it aside. After the work had been abandoned by La Croix, Smith took it up, and by making some improvements, succeeded in making the purifier practicable. He first operated it in Christian's mill in Minneapolis, and after a few months built more machines and set them up in Pillsbury's mill. By this time some of the flour from Christian's mill reached New York. It immediately attracted a great deal of attention. The flour was far superior to that produced by the old methods. Millers at once became interested and flocked to Minneapolis to see how the flour was produced. At first they were not admitted to the mills, but finally they were permitted to see the purifier at work. About this time Barter, who was a millwright in the employ of Bean, Bangs & Co., of Fribault, Minn., went to Minneapolis, and, in company with Mr. Bean, was shown through the Pillsbury mill, where they saw the machine in operation. Now, it's right here that the perjury case commences. Mr. Smith claims that he showed Barter through the mill, while Barter swears that he did not. All the evidence in the cases that were afterward tried goes to show that Smith did show Barter through. Well, after Barter and Bean had seen the machine working they went to a shop near by and saw some of the machines in course of construction. They then went home, and Barter commenced the manufacture of a machine similar to Smith's, only having two sieves instead of one. By this device he expected to evade Smith's patent. I was engaged in milling in New York state at this time, and started for Minneapolis like the rest to see the new purifier. I was advised to stop off on the way and see Barter's machine, which I did. The machine was only partly completed. Barter admitted that he had seen Smith's machine, but claimed that he was building a better one. He did not claim to be the inventor. He, with Mr. Bean's recommendation, advised me to take him to New York state, where he would engage in the manufacture of purifiers. I then went to Minneapolis and saw Smith's machine. I was much pleased with it. This

was in February. In May following, Barter called at our mill on his way from Washington, where he had been getting out patents, and wanted to supply us, but we preferred to deal with the inventor, and would have nothing to do with him. Shortly after this Smith concluded to sell his machines to the public. He began manufacturing and selling the machines all over the country. They were in great demand, for by their use the value of flour was advanced \$1 per barrel. He had several law suits with Barter, and succeeded at last in beating him in the highest courts in the land."

"Barter then went to Canada, but Smith had patented his machine there also, and about 1875 he had a law suit with Barter and beat him in the highest Canadian courts."

"Later, in another suit, the validity of the Smith patents was affirmed in a decision rendered by the judiciary committee of the Queen's Privy Council in London. It was during this case that the alleged perjury was committed. Smith swore that he had shown Barter through the mill at Minneapolis. Barter claims that this was perjury, that Smith did not show him through the mill. He, however, admits that he was shown through, and that he did not know Smith at the time. The evidence at the time of the trial went to show that Smith was right. Now here's the question: If Smith committed perjury ten years ago, why didn't Barter have him arrested then? He swore yesterday that he hadn't seen Smith since the trial. I know better. He saw Smith and talked with him several times during Smith's case against Goldie & McCulloch, of Gault. I saw them talking together myself. In 1884 or 1885 the Toronto Board of Trade called a convention of Canadian millers to meet at Toronto and see about making terms with Smith. Barter attended and Smith addressed the meeting. Still he swears that he had not seen Smith since the time the alleged perjury was committed. It looks exactly as if Barter wanted to humiliate Smith by having him arrested when he could get no redress. The case was tried yesterday, and the justice said that Barter had no case at all. He would have thrown it out of court but for the importance of the previous case. The fact that Smith only had to give \$200 bail and was not even asked to give bonds for that amount, shows what little importance the Toronto justice attaches to the evidence against him."

In addition to the above we learn that the Smith Co. have for some time had suits pending against W. & J. G. Greey, of Toronto, for infringement, in which a vast amount of evidence has been taken both in Canada and Europe, and the cases nearly prepared for submittal. The unsatisfactory nature of the defendant's testimony led them to make overtures to Mr. Smith early last week for a settlement out of court, and it was at their solicitation that he went to Toronto to confer with them on this subject. Immediately on his arrival he was arrested as above mentioned. An offer was made him by the interested parties after his arrest to not only "arrange" that matter, but also settle the infringement suits, which was promptly rejected.

We will send the U. S. Miller and American Miller for one year for \$1.50.

WATER IN BREAD.

Translated from the Austro-Hungarian *Mueller*.

A local police court in Wurtemberg, aiming at the prohibition of the sale of bread not perfectly baked and containing too much water, recently addressed the royal chamber of trade and commerce asking what methods should be employed to test the amount of water contained in bread, and the probable cost of employing those methods. The answer received from the authorities was published by Herr Alett in Wurtemberg, and we present it herewith to our readers. After stating that not even a quantitative analysis would decide the exact amount of water contained in bread, that the proportion might be obtained by drying out the bread, whereby the loss of weight would measure the water lost, and that, for a decision as to the goodness of the bread, the determination of the amount of water in the crumb when separated from the crust would be valuable, the following things were designated as necessary:

1. A scale capable of weighing 200 grams and of accurately weighing one-tenth of a gram. Such scales may be obtained of the gaugers.
2. A drying room or air-bath, 25 centimeters deep, built of copper, which may be obtained of mechanics for about 30 marks.
3. A thermometer which registers over 100 degrees Celsius, costing two and a half marks.
4. A gas lamp for heating the air-bath, costing with the necessary gas connections four marks, and an iron chimney costing 30 pennies. From these figures it appears that the entire necessary apparatus will cost about 37 marks.

The determination of the proportion of water is accomplished in this way: Out of the center of the loaf of bread a piece is cut in a vertical direction, and this is divided into equal parts. A fourth part of these, from which the crust has been separated and the crumb of which is weighed, is devoted to the water-test. The crumbs to be dried should weigh at least 50 grams, and it is better to take 100 grams. The weighed bits of bread are placed in the air-bath on a floor raised about five centimeters from the floor of the bath, with a paper underneath, and the thermometer is so suspended in the chamber that its bulb is suspended among the crumbs of bread. If the bulb of the thermometer were placed higher than the crumbs, the instrument would show a lower temperature than that surrounding the crumbs. Then the lamp is lighted and placed under the bath, and the flame is so regulated that the thermometer rises slowly and after a few hours registers only 100 degrees Celsius. A little practice will enable the investigator to so regulate the flame that the temperature shall remain between 100 and 110 degrees Celsius, in order to perfectly vaporize the water in the bread. When it appears that the water has been expelled, the bread should be taken from the box and weighed after cooling. Then it should be again placed in the box and subjected for a half hour to a temperature of 100 to 110 degrees, and this operation should be repeated so long as diminution of weight is perceptible. The loss of weight answers to the water contained in the bread and may be easily reckoned in per cent.—*Dominion Milling News*.

THE WHEAT PLANT AND ITS FLOWERS.

In an article in the *Contemporary Review* on western wheat crops, Dr. Paley discusses the causes why we only get some 12 or 15 bushels for every one we sow, instead of from 150 to 300 bushels, as is theoretically possible. Incidentally he refers to another matter of importance relating to the fertilization of the wheat plant, saying there is a popular idea about the wheat plant which is entirely erroneous. It is thought that if high winds prevail while the wheat is in flower, the anthers, which are then seen dangling from the ears, will be blown off, and the grain will not set through the loss of the pollen. Year after year we see this statement made in agricultural journals and corn reports, and so sensitive is the corn market that even the price of wheat may be affected by adverse reports on this head. But the fact is, these anthers, when protruded, have already performed the office of impregnation, which takes place within the closed glumes. The "flowers" seen hanging down are exhausted anthers, and wholly useless. If a storm were to blow every one of them away, there would not be a grain less in the crop.

Mr. Darwin's discovery, that Nature for the most part effects cross-fertilization, either by the wind or by the agency of insects, may, perhaps, like other new theories, be pressed somewhat too far. There are two facts which go far to prove that wheat (and the same is probably true of many others of the *Gramineæ* is really self-impregnated. One fact is, that the ovary—i. e., the young seed—is enclosed in a double sheath (the chaff of the ripe seed), which is tightly closed except for a moment when the expended anther is protruded; and the other fact is, that in favorable seasons all the grains in one ear are fertilized and matured. Now, if the pollen reached them only from a dust cloud so to call it, and was air-dispersed, like that from Scotch firs and yew-trees, neither of these facts could take place. Subtle as pollen dust is, and very small as is the quantity necessary for fertilization, it could only find its way into a few of the closed glumes, and there would always be a great preponderance of barren ears.

The following interesting experiment seems conclusive. I have often tried it, and always with exactly the same result:

"Gather half a dozen green wheat ears from a plant which is just beginning to flower, and keep them for an hour or two in a warm room in a glass of water. You may then watch the anthers in succession in the very act of being protruded through the tips of the glumes, which open just a little to let the thread-like filament hang out, and then immediately close up tightly. To actually see this gaping of the glooms, you must keep a very close and minute observation. Then cut off from the ear one of the green seed-cases, which appear next about to flower. Remove the ovary with its three stamens and feathery double pistil, and lay these organs on a piece of glass. Breathe on them gently, and you will see the anthers burst with a kind of spasmodic motion, scattering the pollen partly on the pistil, to which, as a magnifying glass will show, it adheres in minute globules, partly on the glass. But when the spurting takes place only within the glumes, the pollen must be confined to the cavity which contains the pistil and its

numerous stigmas, unless, which is possible, some few grains escape when the empty anther is protruded.

Immediately after the bursting of the anthers the filament becomes restless and begins to move. Contrary to the usual nature of this organ in plants, it is elastic, and you may watch it increasing to the length of about half an inch, carrying with it, as it creeps on the grass, the now empty and useless anthers.

The point of the observation is to prove that the filament does not expand till after the discharge of the pollen, and, therefore, that the anthers when exposed to sight, or when we say "wheat is in flower," are expended. They may be pulled off by hand as they appear, and yet all the grains in the ear will be just as perfect. Consequently, the fear of high winds "blowing off the bloom" is wholly baseless.

This exceptional elasticity of the filament is a wonderful fact. Its purpose is to make room within the narrow seed-case, for the enlarged grain by ejecting the used-up organs of the inflorescence. Occasionally, in a ripe wheat-ear, you will find they have not been got rid of, but lie shrivelled and crushed up within the glumes.

Years ago, when I was making careful observations into the phenomena of corn-growing, I used to watch in a cornfield, on a sunny day, the momentary process of the opening of the glumes for the extrusion of the anthers. I compared it to the opening and shutting of an oyster shell. My readers, however, must be warned that very close watching and very sharp sight are necessary for actually seeing the operation, which is slight, and almost momentary.

Though botanists will, perhaps, insist that it is a heresy in science to regard the wheat plant as "cleistogam," or fertilized solely within its own enclosure, I must maintain that all my observations have led to that conclusion. And if windy weather is in some way injurious to wheat, in the flowering stage, and causes it to yield in the threshing less than was expected, the reason must be this: that wind and cold and wet, very commonly accompany each other in an English summer, whereas warmth and a quiet atmosphere during the month of June are favorable to the development of the pollen tubes.

NEW PUBLICATIONS.

THE GLASSE OF TIME, in the First and Second Age. Divinely handled by Thomas Peyton, of Lincolnes Inn, Gent. Seen and allowed. London: Printed by Bernard Alsop for Lawrence Chapman, and are to be sold at his shop over against Staple Inn, 1623. Now re-printed in a neat volume, Long Primer type, bound in fine cloth, gilt top, beveled boards. Price, 50 cents. John B. Alden, New York, publisher.

OGILVIE'S POPULAR READING.—We have just received a copy of Number Twenty-seven of Ogilvie's Popular Reading—price only 30 cents—containing nine stories—all complete. J. S. Ogilvie & Co., publishers, 31 Rose St., New York.

CENTURY AND ST. NICHOLAS.—Mrs. Frances H. Burnett, the novelist, has written a serial story for *St. Nicholas*, called "Little Lord Fauntleroy," the hero of which is a boy-character who is as new as he is delightful. The story was begun in the present volume of *St. Nicholas* and will run through the year. Mrs. Burnett is at work on a new novel for *The Century*.

A HANDSOME catalogue has just been issued by the Case Manufacturing Co., of Columbus, O. Millers should send for a copy.

READ CAREFULLY, FOR IT IS OF GREAT INTEREST TO ALL MILLERS THAT ARE GRINDING GRAIN FOR FARMERS.—The undersigned has been to considerable expense and careful study to get up an Exchange Table for the use of millers who are doing custom or exchange business; a great number of so-called tables have been put on the market, and we have failed up to this time to see one that is of any practical use. We have thus been stimulated in getting up one that is of practical use, as it tells you at one glance how much flour as well as feed to give for any amount of wheat (from five pounds up to any number of bushels). No matter what the grade of wheat is, it shows at once how much flour and feed (toll deducted) the farmer is entitled to. A boy that can read, can exchange any grist as well as an experienced miller, and the proprietor is always sure of his allowance of toll and the farmer is satisfied every time. We are practical millers and have used this table in our mill to the entire satisfaction of all concerned. Our neighbor millers have all got one in daily use and are well pleased, as it saves time and perplexing figures. It is printed with nice, plain type, and is only 9x10 inches in size, can be framed and hung up, and will last a life time.

Will be mailed to any address in U. S. and Canada on receipt of one dollar, and if parties are not entirely satisfied, the money will be returned. Yours Respectfully,

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We wish to call the attention of our readers to the above circular. We have examined the table and believe it to be the most practicable table ever gotten up. Every miller should send for one. EDITOR.

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MACHINE BAKERIES IN AUSTRALIA.

The following extract from the *South Australian Advertiser* is interesting:

MACHINE BAKERY IN AUSTRALIA.—Messrs. W. Menz & Co., the well-known bread and biscuit bakers, of Wakefield street, Adelaide, have just imported one of Pfeider's dough-mixing machines, and are consequently enabled to place the bread before their customers without being kneaded by hand, as has heretofore been the general practice. Messrs. Menz's premises occupy fully half an acre, and are most roomy and spacious. There four ovens, each 12 by 15 feet, and every accommodation is provided for cooling the bread and packing it in the delivery carts. The firm, in addition to turning out a very large quantity of bread, manufacture biscuits of all kinds. One of Vicker's large biscuit-cutting and stamping machines, is used, and the biscuits are thoroughly dried in a large drying-room situated over the oven. The motive power of the machinery is supplied by a 12-h. p. gas engine. The new kneading machine is found to be most useful in mixing and kneading dough required for the biscuits.

A Scotch correspondent forwards the following abstract from the Sydney (New South Wales) *Evening News*, for which we give space with pleasure. We learn that the greatest difficulty the Australian bakers encounter in business is to obtain sound yeast. There the town bakers have always relied on local brewers; and while it is admitted that science has improved Australian beer it is not so with the yeast, which, it is asserted, is becoming more and more worthless for bread fermentation. Various causes are assigned for this which need not be described. Colonial bakers should throw brewery yeast aside and make their own; either a patent—so called—of malt and hops, or a flour barm from red winter flour, similar to Scotch "Parisian Barm." For a hot climate we would prefer a yeast from pure malt and hops only.

"For several years bread-making by steam machinery has made great progress. The bread and pastry of nearly all the large bakers and pastry-cooks in London is made entirely by machinery. It is a matter of regret that these improvements have not been more widely adopted in this country. Up to a week or two ago there were only two steam bakeries in this colony, and they are in Sydney. About a fortnight since Mr. J. G. Purves, a well-known master baker of Sydney, started a new steam bakery at his establishment in St. John's Road, Glebe. The plant includes one of Thomson's celebrated mixing and kneading machines, a Baker's patent sifting machine, and a Baker's patent potato pulper and refrigerator. These machines are all connected with one another by shafts and pulleys, and are driven by steam which is generated by an Otto gas engine of 3½ horsepower. These machines may all be worked simultaneously or separately. Each of them effect a wonderful improvement in the quality and cleanliness of the bread, and at the same time effects an enormous saving of labor. By means of the sifter the flour is freed from all foreign particles, even to the fluff which wears off the inside of the sack in the course of handling, the thoroughness of the process being shown by the fact that it eliminates from every sack of flour two and three handfuls of fine fluffy tow, which would otherwise

have passed into the kneading trough, and thence into the customer's stomach. From the sifter, which is fixed above the kneading trough, the flour can be delivered directly into this latter and the rate of delivery regulated as required. The kneading apparatus is a half cylinder, composed of galvanized iron ends and wrought iron plates, and is adjusted with a differential motion and reversing and double action. Inside the cylinder are two sets of broad flat iron prongs, set on to axles which revolve in the manner above described. The advantages of this arrangement are manifest. The hand, clean or unclean, never touches the flour until it has been made into dough, ready to be placed in the oven in the form of loaves. In addition to this the dough is better worked up than under the hand process, making the texture firmer, and thereby producing a lighter and more blocked loaf. As regards the potato pulper and refrigerator, this is a very ingenious contrivance for making the ferment used by bakers. It consists of a cylinder, inside of which is placed a fine sieve, close to the surface of which are revolving prongs and grippers, which smash up the potatoes into a fine pulp and squeeze it through the sieve, leaving behind all the skins and refuse, of which too much found their way into the bread under the old system. In warm weather the pulp can be forced through a refrigerator, whereby its rapid fermentation is induced, and much valuable time saved. Thus economy, quality and cleanliness are secured. The whole of the arrangements are thorough and complete. Attached to the two ovens are a couple of Baker's patent pyrometers, by which the heat of the ovens is ascertained and regulated, and thereby sodden or burned bread avoided. The bakehouse itself is light, airy and well ventilated, and its coolness and cleanliness have been largely enhanced by the laying down of a tile floor. The store-rooms are large, well-stocked with the best qualities of flours from all the colonies, conveniently situated and well arranged. In fact the whole plant constitutes a model bakery, embodying as it does, every modern scientific improvement. A considerable capital has been expended by Mr. Purves in importing this machinery direct from London, and in erecting new buildings to contain it. There is every evidence of intelligent enterprise, and there can hardly be a doubt that its success will prove that bread-making by steam machinery, in a proper locale, is much more profitable and more congenial to the progressive spirit of the age than the crude processes of earlier days."

BREAD-MAKING BY STEAM.—At the bakery premises of Mr. J. G. Purves, Forest Lodge, an ingenious and recently-invented system of bread-making by steam power was commenced yesterday afternoon. The proprietor, at a cost of considerably over \$500, lately imported one of Thomson's differential motion reversing and double-action dough-mixing and kneading machines. So elaborate a title explains the intention of the patent amply. Of its actual working and effect suffice it to say that, in the presence of about a dozen master bakers and visitors from Sydney and elsewhere, after the gas apparatus by which the machinery is worked had been set going, everything worked without a hitch. In from six to seven minutes, a "dough" was made—noiselessly, and free

from dirt or dust—which, under the old system, would have necessitated two men's hard work for forty minutes. A patent sifter and potato-pulper form part of the plant—both very ingeniously and economically contrived. By means of the former, in particular, the flour undergoes a system of absolute purification, so much so that from a "cake" of the finest refined brands nearly half a hatful of a substance resembling engineers' waste—the wear and tear of sacking, &c.—was collected, which, under ordinary circumstances, must have passed into the trough undiscernable to the naked eye.—*Sydney Herald*.

We will send Harper's Weekly and the U. S. Miller for one year for \$4.10.

THE TEACHING OF MILLING.

The Pennsylvania State Agricultural College, like others of a similar nature, provides a carefully conducted system of agricultural experiments, and a practical course of instruction on machine making. If the manufacture of flour could be brought into the curriculum, it would form as interesting and useful a line of investigation as any that could be undertaken. There are more new ideas being brought forth in flour milling just now than in any other line of industry. Take the experiments of Homer Baldwin for the direct purification of flour, and this one idea constitutes not only a plan different from that now in practice, but may possibly be the starting point of radical changes in existing methods. An institution having no other object but the improvement of machinery and practice, and with no interest in the selling of such machinery or its products, ought at least to be of interest equal to any whose aim it is to benefit industries of no greater consequence than flour milling; very elaborate experiments are being constantly made under State assistance to test the feeding value of mill products, yet no consideration is paid to the production of such products other than the growing of the grain and its final consumption, its preparation for food uses not being considered. Some of the colleges, like Cornell, which give a practical course of study in the useful arts, and which have at the same time ample means for any purpose of investigation, might take up the subject of flour milling with advantage to all concerned.—*Millers' Review*.

We will send you a copy of "Leffel's Construction of Mill-dams, and Bookwalter's Millwright and Mechanic," and "The U. S. Miller" for one year for \$1.30. Don't miss it.

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OUR COMMERCE WITH ENGLAND.

After all, this country is not doing nearly as badly in her commercial relations with other parts of the world as some free traders would have us think. A statement furnished the Department of State, by one of the Government officials abroad, shows that, in spite of the fact that Great Britain is especially a manufacturing country, whose avowed object is to supply the world, she only manages to get out of the United States for her productions about one-third as much as the United States gets from her in a like manner. The imports into the United Kingdom from the United States in 1884 amounted to \$431,392,705, a decrease of \$64,802,095. The imports to the United States for the same period amounted to \$163,692,665, a decrease of \$16,969,865. While the difference in the diminution of trade between the countries was \$41,832,230 in favor of that Kingdom, the balance of trade was \$267,700,000 in favor of the United States. The principal falling off in the English exports in question occurred in wrought and unwrought metals, cottons, earthen and china ware, machinery, wearing apparel, skins and furs, chemicals and dye stuffs, hardware and cutlery, cement and animals. The principal increase was in silk manufactures, telegraph apparatus, wool, paper and rags. The principal falling off in the English imports from the United States was \$45,572,900 in corn, grain and flour. The chief increase was in sugar, copper and hops. The fact is of encouraging significance that the United States maintained the large percentage of former years in the aggregate exports of grain, flour and cotton. It is believed from present indications that the record of the current year will be in all respects an improvement on 1884.

THE CALIFORNIA FLOUR TRADE.

The following statement relative to the flour trade we find in the *San Francisco Alta*:

The total demand for California flour, both for export and home consumption, is about 1,500,000 barrels a year. The milling capacity of the State has increased so largely since 1882 that the increased capacity alone would more than supply the total demand. The total daily capacity of the mills of the State is 20,000 barrels, which would give an annual product for three hundred days in the year of 6,000,000 barrels, or four times the amount for which we have any legitimate demand. The actual capacity of the mills, however, is reduced by mills running only part time, and by other causes, about 50 per cent., so that the real product is only about 3,000,000 barrels 50 per cent. of which is in excess of the demand, both home and foreign.

RECENT MILLING PATENTS.

The following list of Patents relating to milling interests, granted by the U. S. Patent Office during the past month, is specially reported by Stout & Underwood, Solicitors of Patents, 66 Wisconsin st., Milwaukee, Wis., who will send a copy of any patent named to any address for 50 cents:

ISSUE OF FEBRUARY 2, 1886—No. 335,155—Device for tightening bolting cloth, G. T. Smith, Jackson, Mich.; No. 335,257—Feed mechanism for roller, grinding mills, etc., P. Van Gelder, England; No. 335,220—Wheat cleaning and polishing machine, E. Fritsch, Leipsic, Germany; No. 335,391—Grinding mill, G. K. Smith, Chicago, Ill.; No. 335,418—Millstone bush, D. A. Beelows, Mulberry, Ga.; No. 335,454—Flour bolt, N. W. Holt, Jackson, Mich.; No. 335,543—Flour bolt, G. T. Smith, Jackson, Mich.

ISSUE OF FEBRUARY 9, 1886—No. 335,002—Cockle separating machine, C. D. Edwards, Albert Lea, Minn.; No. 335,573—Pulverizing machine, W. M. Fuller, New York, and J. J. Hayes, Brooklyn, N. Y.; No. 335,574—Pulverizing machine, W. M. Fuller, New York, and J. J. Hayes, Brooklyn, N. Y.; No. 335,642—Flour bolt, G. T. Smith, Jackson, Mich.; No. 35,688—Oat hulling machine, J. E. Penner and Dan Brunson, Kansas City, Mo.; No. 335,949—Grain measuring apparatus and sack holder, R. C. Livingston, Spring Valley, Minn.

ISSUE OF FEBRUARY 16, 1886—No. 336,246—Grain separator, A. Lent, Sleepy Eye, Minn.; No. 336,402—Mechanism for extracting steel and iron from grain, F. E. Fisher, Detroit, Mich.; No. 336,533—Millstone dress, H. E. and C. W. Sylverster, Marengo, Ill.

ISSUE OF FEBRUARY 23, 1886—No. 336,567—Fan for grain separators, J. Hawk, Canton, Ohio; No. 336,655—Cockle separator, C. A. McCollum and M. Forder, Dassell, Minn.; No. 336,755—Grain elevator, M. Q. Seeley, Fremont, Neb.

JIM AS AN ENGINEER.

Jim's a good-natured happy-go-lucky; he's served his time in the machine shop, knows all about blacksmithing, and as for a stationary engine, why bless your soul, he's designed more than you ever saw. His uncle was a big stockholder in the company, and Jim was sent up to make himself generally useful, and show the country bumpkins a thing or two.

When he came all the places were full, so Jim swept up the shop and did some helping. To be sure, he left some chips under the lathes and the bench was not very clean; but you know, Jim was an engineer and machinist, and not a roustabout.

At last business picked up, and Jim was set to work running the engine nights. Then he was in his glory. First he thought the globe valve on the feed-pipe ought to be shut. Of course he forgot to open it when he started the pump. Well now you just ought to have seen that packing come out, and the water squirt over the engine and machinery. Jim caught a good mouthful and then left, and never stopped till he was out-doors. It rather scared him, but in a night or two he was ready to try another dodge.

The pump didn't leak, but Jim thought it needed packing, or anyhow that gland must be screwed up, and up it went; and the first thing he knew the plunger stopped, stuck tighter than a drum. Well, the engine went on serenely, and the set screw that was to have held the crank cut a nice little groove around the shaft.

Now that valve motion is all out of kilter, and needs resetting. So one night while the men were at lunch, off comes the steam-chest cover, and the valve is reset. Engine starts a little lame, but Jim knows she will soon get over that. But pretty soon there is a rattle, the engine limps worse and worse, and then with a final rattle she stops. Investigation showed a nut off the valve stem. It had dropped into a steam port, been blown out into the exhaust and up the smoke-stack, till it struck the elbow, when it dropped back upon the vertical boiler, where it was found next day.

Then Jim thought that perhaps it was not the valve after all. The pound must be in the eccentric straps, and I'll just tighten 'em up. Well, now, almost before he could put that monkey-wrench down on the bench there was a loud snap, and a broken eccentric rod went whirling around with the shaft. This time the eccentric and strap were both cut and the rod broken. Jim smokes away,

and says the engine is no good. Manager thinks about the same of Jim's engineering qualifications, and gives him a job where he won't have quite so good a chance to raise Cain, but Jim was still alive, and didn't fail to let us know it.—*Power*.

NONSENSE.

JEEMS knocks a cup off the mantel, shivering it into a thousand fragments. His mistress, hearing the noise, rushes in and stands a moment stupefied by the result of her servant's awkwardness. "Oh," she cries with tears in her eyes, "my beautiful old Severes!" "O," exclaims Jeems, in a joyous tone, a seraphic smile spreading all over his face, "I was so frightened at first. I thought it was something new."—*Paris Figaro*.

SNOOKS was a hard case, but he took a turn about and joined the church, expecting great spiritual regeneration from the act. Next day he was perambulating his shop in a deep study and soliloquizing *sotto voce*, yet so loud as to be overheard by his workmen: "I hain't experienced any conversion. I don't see any difference, I don't feel any change, and— it, I don't believe there is any."

AN Irishman caught a bee after it had stung him, and, examining it carefully, he said: "Ye dirty little blaggard, yez been sittin' round till yez worn the seat out of yer breeches, and bedad oi've found yer knife shticken through yer hip-pocket, ye little haythen!"

RANSOM CHEESE.—Uncle Billy Stokes, a colored individual from one of the back counties in Mississippi, where old-fashioned wagons with wooden axles are still in use, and where the primitive "tar-bucket" is part of their "running gear," was in Canton, Miss., a few days ago, standing in front of Matt. Hiller's store watching the unloading from drays of newly arrived goods. One dray contained, besides several barrels of groceries, a number of boxes of cheese and a dozen or two boxes of patent axle grease. Uncle Billy's eye rested upon the latter, and he inquired:

"Mars. Hiller, what yer ax for one of dem little cheeses?"

"Only 50 cents, Billy, do you want one?" was Mr. Hiller's reply.

"Wal, yes, boss; but ef I buy de cheese will yer fro in de crackers?"

"Of course, I will," said Mr. Hiller, as he handed Uncle Billy a box of the axle grease and then passed behind his counter and took a handful of crackers from a box and gave them to the old man.

Uncle Billy then went to the back door of the store, and seating himself on an empty dry goods box, proceeded to enjoy his lunch. He had been there about five minutes when Mr. Hiller concluded he would see what progress he was making; so, going to the door, he saw the old man, with his barlow knife in hand, spreading the grease on a cracker, while his jaws were vigorously working and his mouth and chin covered with crumbs and grease.

"Well, Uncle Billy," said Mr. Hiller, "how do you like your lunch?"

The old man rested his knife on his right knee, and drawing a heavy sigh, replied:

"Boss, dem ar crackers are pow'ful good; but lor, boss, dis am the ransomest cheese, 'fo' de Lord, I ever tasted."

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In India rice forms the staple food of the inhabitants. In large towns the consumption of wheaten flour is on the increase, and hence wheat milling; but rice is still the dietary of the people. The small percentage of gluten which it contains is, however, against it, and from long cultivation on the same ground without the proper application of manure, the percentage of gluten is greatly decreased below what may be considered the normal standard. It was otherwise in the United States of America, where, by careful attention to the requirements of this crop, raised on virgin soils, Carolina rice realized at one time in the English market, "nearly three times the price of Indian rice," according to the *Agricultural Gazette* of India. Such exposures by the Indian press naturally drew attention to the necessity of improvement in rice culture, and of late years the quality of the rice, including the percentage of gluten and the yield per acre, have both been improved. And although this improved practice is yet the exception, there is hopeful evidence that it will ultimately become the rule.

One of the greatest drawbacks to rapid progress in India is official mismanagement at the Government experimental farms.—Were intelligent native agriculturalists appointed to the management—and no difficulty would be experienced in the selection of such—their successful practice would be viewed in a different light by the small farmers, and hence followed with greater confidence.

In the museum at Calcutta some 1,400 varieties of the rice plant are exhibited, but it will be unnecessary to wade through such. The practical question is to select the best for diversity of soil and climate, and to improve these by cultivation and manuring. The whole may be divided into two classes,—1, water rice (*Oryza sativa*), and, 2, mountain or dry land rice (*O. mutica*). Several varieties of the latter are grown in India, but the berry is small and the yield per acre less than the former.

No reliable statistics of the acres under rice is given. Simmonds, in his "Tropical Agricultures," quotes Bengal and Madras Presidencies at about 40,000,000 acres, and Burmah, now added to the Empire of India, at 2,000,000 acres; but this is leaving out of account Bombay and some of the native states, etc., so that 50,000,000 acres are probably nearer the mark.

The yield per acre is variously stated, and may be quoted at from 800 lbs. to 2,000 lbs. But as from 3,000 lbs. to 4,000 lbs. have been grown per acre, the question naturally arises of a much higher general maximum per acre. This applies to water rice only; no statistics of the yield of dry land rice is given per acre.

In harvesting rice the crop is generally cut with a tool of the siekle kind, and bound in sheaves. There is, however, nothing to hinder this crop being harvested by a sheaf-binder, save the poverty and, it may be, the prejudices of the Hindoo farmers. And as the latter are giving way to the progress of things the question naturally arises, Can an Indian contractor harvest the crop with a sheaf-binder at less money than the small

farmer can do by manual labor? The answer to this hinges upon certain conditions, viz., 1, Can rice sheaf-binders be made suitable for two Indian bullocks? 2, What breadth will the machine cut? 3, At what pace will the bullocks move in the broiling sun of India? 4, Would it be practicable to introduce mules in preference to bullocks for all kinds of farm work?

At one time the money value of farm work was as low in Britain as in India at the present day, yet the balance at the years' end was against the farmer—as compared with the present day; and this without doubt is the position of the Indian farmer. "Time," says Franklin, "is money," and with a sheaf-binder hauled by two mules, as in the United States of America, an Indian contractor could harvest a crop of rice at a fraction of the time it takes the Indian farmer to do it. In Eastern Europe, Turkey and Egypt this is done by bullocks in harvesting wheat crops, so that the day is looming in the distance when rice, wheat and other crops will be harvested in the same way in India.

Thrashing is generally done on the thrashing floor, as in patriarchal times, the rice being trodden out by the feet of bullocks in the same way as wheat. In Egypt a thrashing instrument on wheels is hauled over the rice on the thrashing floor, as described by the prophet Isaiah, the Roman writer Varro, and more recently, 1772, by Niebuhr, with illustration. But Messrs. Clayton and Shuttleworth, of Lincoln, are now sending out thrashing machines to India for thrashing rice similar to the wheat thrashing and straw bruising machines of the same firm, of which an illustrated description was given in the *Millers' Gazette*, Nov. 2, 1885, pp. 541-2, the only difference being that a different construction of drum is used for rice. It follows that by means of an additional drum the same thrashing machine may be used for thrashing wheat and rice, a wheat drum being used for thrashing wheat and a rice drum for thrashing rice, the bearings being common to both drums. The economy of this arrangement will appear manifest, as thrashing machine contractors can easily, with the necessary tackle, lift out the one drum and replace it by the other. Clayton and Shuttleworth's thrashing machines are sent out to India, not only adapted for thrashing rice and wheat, but all the other crops grown, now generally thrashed by the feet of bullocks, or some other primitive way. When Andrew Meikle invented the thrashing machine it was calculated that the gain to this country was over £2,000,000 annually. Such being the British gain at the close of last century, what must our Indian Empire gain, considering the immense area under crop, and the fact that two, and sometimes three, crops are harvested from the same land in one season? At present, in some cases, the Indian farmer has his crop thrashed by contract, his wheat and rice being trodden out by the bullocks of the contractor, or he may agree to give his own bullocks. It would be interesting to know the time and money spent in thrashing the whole of the rice crop of India, including the cleaning and dressing the paddy for home use and market. To multiply the fifty million acres by 2,000 lbs., the amount of produce per acre, gives one hundred billion pounds, and this again by the expense of time and

money in harvesting, thrashing and dressing, may not inaptly be said to baffle calculation. But were the work done by sheaf-binders and thrashing machines as it is done in harvesting and thrashing the wheat crops of the Far West, where on some large farms upwards of 100 sheaf-binders, hauled by mules, enter the harvest field, followed by a sufficient number of thrashers to do the thrashing, what a saving would be effected! Between the "go-a-head" spirit of our Transatlantic cousins and the farmers of India there is hardly any comparison, but, great as the difference is, it is annually diminishing in magnitude, so that the future may see it reduced to equality.

The number of paddy mills in India is greatly on the increase.—*The Millers' Gazette*, (London). W. B.

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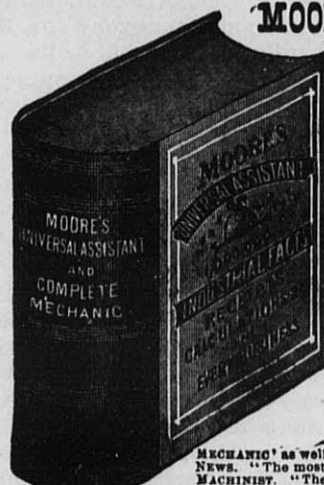
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A Few Words About Cawker's Flour Mill Directory for 1886

A FLOUR MILL DIRECTORY.—Cawker's American Flour Mill Directory for 1886 contains in convenient form much which renders it very desirable to the trade. The book is compiled by Mr. E. Harrison Cawker, editor of the UNITED STATES MILLER, of Milwaukee.—*Bradstreets*, Feb. 20, 1886.

WE are at a loss to know why Mr. Cawker delayed so long in sending us a copy of his new directory of flour mills of the United States, which has just been received. Now that we have it, we are able to say that it is apparently a valuable and carefully prepared volume, and also to allude to a matter which those unfamiliar with the trade may not understand. The footings of the various states and territories and the Canadian provinces included in the book show there are 18,169 mills, a loss of 6,823 since the publication of the directory of 1884. This, however, by no means indicates that there has been any such decrease in the number of mills. It only indicates that Mr. Cawker has taken considerable more care in the preparation of the present volume than in his previous one, and has excluded from it a large number of feed mills, saw mills, cotton gins, etc., which appeared in his issue of 1884. The number of mills in the country has, we believe, decreased but slightly, and we are quite positive that their capacity on Jan. 1, 1886, was considerably in excess of the daily capacity Jan. 1, 1884. Our own lists show an increase in number in nearly every northwestern state and territory, and an increase in capacity of from ten to fifty per cent.—the latter being the case in Dakota.—*Northwestern Miller*, Feb. 12, 1886.

THE correction of errors in last year's flour mill directory, by which some six thousand mills were at one fell blow rendered invisible, is inspiring such paragraphs as this in the daily press:

Six thousand country mills have quit the milling business, and most of these are of the "merchant" kind, operating to fill the city orders. This would not indicate a very brisk state of affairs in the milling trade.

We pointed out last week that Cawker's directory of 1884 was grossly inaccurate, and it would have been better if the publisher had frankly acknowledged this, instead of causing to be telegraphed all over the country the statement that there had been a decrease of twenty-five per cent. in the number of mills in two years. People who know anything about it, know this to be impossible, while the ignorant write and print silly paragraphs like the one above quoted. The only interest millers feel in the matter is in the fact that the false statement is not likely to cause a grand rush for investment in milling property.—*Northwestern Miller*, Feb. 19, 1886.

WE are sorry to see our Minneapolis contemporary emphasizing the erroneous report sent out by an irresponsible scribbler at Milwaukee, to the effect that Cawker's Flour Mill Directory for 1886, shows a decrease of some 6,000 mills in this country, from the number given last year. In charging that this directory is "grossly inaccurate," our contemporary is, in our opinion, very unjust. The fact is, that Mr. CAWKER is not in error

in what he has undertaken to set forth, which has been simply to give only the flour mills which are actually at work, excluding all the saw mills and cotton gins, and remains of mills which have been burned or destroyed. It is undoubtedly the most accurate and useful directory that Mr. CAWKER has yet compiled. An objection to those which have preceded it, was that they contained a great many names of men who never owned a dollar's worth of milling property and who did not represent property. The old directories might have been of use to our contemporary, as well as other milling journals, in procuring subscriptions from operative millers, but to the manufacturers and those who have to do with the real owners of milling property, they were not nearly so valuable as the present edition will prove to be.—*Modern Miller*, March, 1886.

CAWKER'S AMERICAN FLOUR MILL AND MILL FURNISHERS' DIRECTORY FOR 1886, is somewhat reduced in size, but for the sake of the reduction nothing has been sacrificed. A list of millers and of leading millwrights in every state and territory are given, and a list as well of the principal flour brokers, flour exporters and importers in various parts of the United States, Canada and Europe. The number of addresses contained in the directory is given at 20,000. Milwaukee: E. Harrison Cawker. Price \$10.—*Leffel's Mechanical News*, March 15.

"CAWKER'S FLOUR MILL DIRECTORY FOR 1886" is out. It shows a total of 18,289 mills in America, a net decrease (according to Cawker) of 6,812 mills, as compared with 1884. The book is a handy compilation for persons who desire to mail circulars, etc., to millers, but as statistical work it is clearly unreliable. The inference from the enumeration of mills in the States and Canada, is that there has been an actual decrease in the number of establishments of 6,842 in two years. That may be according to Cawker, but it is evidently not according to truth. So far as Indiana is concerned there has been no loss of 226 mills, as Cawker says, in two years' time, nor has there been in the aggregate, in this State, any perceptible loss in the milling capacity, and not the difference of a score of mill in the aggregate, if our State Gazetteer and our own lists can be relied upon. What is true of Indiana may be assumed more readily of the newer and more rapidly growing States, which, according to this remarkable statistician, have all, except Dakota, lost anywhere from 3 to 300 mills—Texas, for instance, where mill building is most lively, being set down as 289 mills short of 1884. But it is useless to recall here more of the glaring inaccuracies of this work. The names it contains may be as reliable as any list, and in that respect the compilation is valuable to any one who has use for a list, but in that respect only can we recommend it. Price, \$10. Address E. Harrison Cawker, Milwaukee, Wis.—*The Millstone*, February, '86.

[The editor of *The Millstone* evidently wrote the above notice before he read our explanation for the decrease of number of addresses. The paragraph above from the *Modern Miller* explains the matter very well. Our object was to prepare a directory satisfactory to the trade by which they would be pretty sure to get their circulars and other correspondence just where they wanted it to go.—CAWKER.]

WE are in receipt of a copy of "Cawker's Flour Mill Directory," for 1886, which is in many respects materially improved over former editions. It is not only printed in small-

er and more convenient form, but greater care has been exercised to exclude from the list everything except mills in actual business, and these are again so marked that in using the list the relative importance and character of the mills can, in the majority of cases, be easily determined. The work can be obtained by writing to E. Harrison Cawker, Milwaukee, Wisconsin.—*Milling Engineer*, Feb. 1886.

THERE is no subject concerning which the average reporter for a daily paper cannot succeed in eliciting a great amount of misinformation, apparently without half trying. Generally the intelligent portion of the reading public is able to discriminate closely enough to avoid being seriously misled, but occasionally a statement is made, and backed up by seemingly correct figures, that is calculated to deceive all except those who are actually posted. As an instance, the *Evening Wisconsin*, of this city, got hold of a copy of the new edition of Cawker's Flour Mill Directory, and comparing it with an old back number, made the astonishing discovery that there were some 6000 less flouring mills in 1886 than in 1884. This statement was telegraphed widely over the country, and is calculated to foster an erroneous impression as to the real extent of the milling interests of America as compared with previous years. The fact is, that while there has probably been some small decrease, owing to the closing up or failure of a few of the smaller and more unimportant mills, the number of new mills built would nearly, or quite, offset the number of mills burned and not rebuilt, and the only reason for the decrease in the number of mills in the new list is solely owing to the greater care exercised in making up the list to exclude all but mills that are actually entitled to the name. The one-horse saw mills and cotton gins with a feed run attachment have been dropped from the list, although they still exist, and are of as little account in the milling line now as they have been heretofore.—*Milling Engineer*, Milwaukee, Feb. 1886.

CAWKER'S American Flour Mill and Mill Furnishers' Directory for 1886 is now ready for delivery. It contains 20,000 addresses. It contains, in addition to the matter indicated by its title, a list of the principal flour brokers and exporters in this country and importers in Europe. The directory is published in pocket-book form, those for the use of commercial travelers on thin paper, and those for office use on book paper. The book is strongly bound. The price is \$10. Copies may be obtained by addressing E. Harrison Cawker, Milwaukee, Wisconsin.—*American Elevator and Grain Trade*, Chicago, Feb. 15.

WE have received a copy of "Cawker's American Flour Mill Directory for 1886," published by E. Harrison Cawker, of the UNITED STATES MILLER. The book is of handy form, containing 140 pages, well printed and well bound, and contains about 20,000 addresses of flour millers in the United States, besides details as to the kind of power used, and whether on the stone or roller system; besides which the financial rating of a large number is given. To those interested this book will be very valuable, and the price (40s) is, considering all things, cheap. We shall be glad to supply anyone

wanting the book.—*The Millers' Gazette*, London, England, Feb. 22, 1886.

THAT invaluable publication, "Cawker's American Flour Mill Furnishers' Directory for 1886," has just been issued. This volume is indispensable to the trade. Mr. Cawker has spared no pains or expense in gathering the information contained in its pages. The enormity of the labor of compilation may be judged from the fact that the book contains 20,000 addresses. It aims to give the correct address of every firm or person owning or operating flour mills in the United States and the Dominion of Canada, the kind of power used in each mill, the kind of grinding machinery in each, the specialty of each, and the financial rating of every mill owner. Besides all these things it contains a full list of the leading millwrights of nearly every state and territory and the principal flour brokers, flour exporters of the United States, Canada and Europe. To millers these lists alone are worth many times the cost of the book. Mr. Cawker has obtained the special points of information from direct correspondence, and this fact lends additional value to the work. The directory is published in pocket-book form, and those designed for pocket use by commercial travelers are printed on thin, light, strong French folio paper. Office editions are on elegant book paper. All the editions are strongly and durably bound. The price per copy is \$10 and the book may be obtained by addressing the publisher, E. Harrison Cawker, Milwaukee, Wis., or the publisher of this journal.—*The Milling World*, Buffalo, N. Y., Feb. 8, 1886.

MESSERS. WELLS, FINCH & Co., prominent produce commission merchants in New York, in a recent letter to us, in referring to Directory, say: "It is the best thing we have seen in its line."

WE have received Cawker's American Flour Mill and Mill Furnishers' Directory for 1886, which, as many of our readers are no doubt aware, is a register of the names and postoffice addresses of the owners of flour mills in the United States of America and the Dominion of Canada. This handbook is compiled under the superintendence of Mr. E. Harrison Cawker, editor of the UNITED STATES MILLER, Milwaukee, Wisconsin, U. S. A., and is calculated to be a valuable assistant to milling engineers and those who deal in any kind of mill furniture. The price (ten dollars in the States or two guineas in this country) may seem high, but then it must be borne in mind that this little directory contains solid information to all who have any commercial dealings with the milling craft, and what is worth having is worth paying for. For the rest, the material part of this work is beyond all criticism. To produce a really handy handbook, unobtrusive in the pocket and not burdensome to the fingers, space has been judiciously economized by the free use of signs and abbreviations, and by printing on a very fine yet strong paper. The printing, moreover, is excellent, and, somewhat unnecessarily perhaps, perennial wear is guaranteed by a pocket-book-like cover of real crocodile hide. We had omitted to say that the list of American and Canadian millers is supplemented by the names of the millwrights and flour brokers of the same region, as well as by a directory of European flour importers. The

last page shows the total number of flour mills now at work in the United States to be 16,950, while the estimate of 1,339 exhausts the number of Canadian mills.—From *The Miller*, London, England.

THE GRAIN HOPPER SCALE SYSTEM.

Mr. Richards, of Chicago, the inventor of the above-named system, is about to introduce it at Cincinnati, and other points where large quantities of grain are received by rail. This system has been used by the Lake Shore & Michigan Southern R. R. in Chicago for two years, and pleases grain shippers and receivers very much.

In describing the system the *Cincinnati Price Current* says:

Car loads of grain are brought alongside the scale house, and are quickly emptied by a system of steam shovels, into a pit, when the grain is carried by elevators to a hopper bin, when the entire car load is weighed at one time—the practice being to have two clerks make a record, to avoid possible error. The grain is then returned to the same or another car, by gravity, and quickly.

This system facilitates business by giving reliable and prompt weights, and it is proposed that it shall be done at no increase of cost over the present method, one dollar a car.

Our grain trade has suffered materially as a result of the track weighing system, causing delays and losses in weight from various causes, uncertainties to shippers as to what they may realize, etc. When the shipper can have assurance that he can be served with strictly correct weights of his grain, he can operate with confidence. When our market can give this guarantee, it will strengthen its attractions and claims for consignments.

THE DEFENDANTS WIN.

Judge Hawes recently gave an opinion for the defendants in the case of the Albion Milling Company, of Michigan, against Blake, Shaw & Co. and Dike Brothers & Minkler, warehousemen. The suit was a replevin to recover \$825 for several hundred barrels of flour, which the milling company, at the request of two swindlers at No. 257 Lake street, calling themselves Warren F. Johnston & Co., shipped in 1883 to them. There is a bona-fide firm of commission men at No. 167 Washington street, named W. F. Johnston & Co., and when the order from the swindlers was received the milling company looked in Bradstreet's and found that W. F. Johnston & Co., at No. 167 Washington street, were reputable men, and the company supposed it was shipping the flour to them. The swindlers received and sold it to a commission man, who deposited the flour with the Garden City Warehouse Company. As innocent purchasers for value, Blake, Shaw & Co. bought the receipts and received the flour, which they sold. The suit was dismissed as to Blake, Shaw & Co., because they were innocent purchasers, and as to Dike Brothers & Minkler, of the Garden City Warehouse Company, because there was no reason to believe that the swindlers on Lake street, who subsequently fled, used any device or artifice to represent themselves as the Washington street firm. They ordered the flour simply on the chance that the company would send it. The latter could not now claim that it thought it was dealing with W.

F. Johnston & Co., of Washington street. The judge thought it very stupid of the company to look in Bradstreet's for Warren F. Johnston & Co. of No. 237 Lake street, and finding W. F. Johnston & Co., of No. 167 Washington street, to suppose they were one and the same firm. The case would present an entirely different aspect had the swindlers forged W. F. Johnston & Co.'s name.

WHEAT AS HIGH IN CHICAGO AS IN LIVERPOOL.

The low price at which East India wheat can be sold in England is among the nightmares that afflict speculators. The case was recently stated in a very forcible manner by Horatio Seymour, Jr., a civil engineer of national reputation, formerly a resident and state engineer of New York. He now resides in Michigan. He put the question as follows: "This India wheat can be laid down in the London and Liverpool markets at 75 cents a bushel. It can be brought to New York by way of the Suez canal for 80 cents, and but for our protective duty of 20 cents per bushel it could be laid down there at that price. Our farmers should note these facts and take steps to protect themselves. As matters now stand they can not expect better prices than they now receive, unless a bad harvest, a famine in India, or a desolating war should intervene to put them up."

A statement of the facts even more concise than that of Mr. Seymour may be made. To-day, June wheat is worth 86 cents in Chicago, 96 cents in New York city and 102 cents in Liverpool. Liverpool appears to have lost control of the price of wheat in Chicago. With diminishing exports, the Western wheat elevators bursting with their contents, and the India scare, wheat remains at a tolerably fair price in Chicago—not very high, nor too high, but not very low, and not as low as it has often been when wheat fleets dotted the ocean between New York and Liverpool, and gold to purchase American wheat was shipped by the cargo from London to New York. It is evident that something beside a foreign demand is keeping wheat at its present price. A few months ago it was sold at 70 cents a bushel, with a possibility that it might drop below that figure. From that point it began steadily to rise, and in November last reached as high as 96½ cents a bushel. It has not since fallen back to within 12 or 15 cents of the level from which it started. During all this period there has been no shipping market for wheat, no foreign demand to increase the price, and shipments from Chicago to Liverpool could not be made at a profit. From these facts it is evident that the vicissitudes of the Chicago wheat market are no longer regulated by those of the Liverpool market.

What mysterious influence it is that keeps the wheat market higher relatively in Chicago than it is in Liverpool, speculators and experts in economic science may discover if they can. It is evident that something beside speculative manipulation, the influence of corners and the effect of long or short sales is supporting prices—not at a high elevation, but on a level above points of low depression, and at a figure at which the farmer can raise wheat and get it to market at a profit.—*Chicago Evening Journal*, March 11, 1886.

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Our manager formerly represented the *Wing Milling Co.*, of St. Louis, for whom
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Use either the "Robinson" or "Underwood" Cypher in telegraphing.

GIVE US A TRIAL! If there is any virtue in *energy, care and fair dealing*, we
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For any information regarding our manner of transacting business, we refer, by
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*Make Purchases of all Grades of Flour direct from mills, and act
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OFFICE, NO. 4 KIMBALL HOUSE, WALL ST.,

Lock Box 175.

ATLANTA, GA.

ITEMS OF INTEREST.

BRIGADIER GENERAL OLIVER O. HOWARD is in his 57th year. He is the senior officer of his grade.

DR. LANSDELL, the English missionary, in a single recent year distributed no less than 56,000 bibles among the exiles in Siberia.

GENERAL TOOMBS' estate in Georgia has been assessed at \$60,000.

MAJOR GENERAL JOHN POPE will be 62 years of age on the 16th inst. He will then be retired.

FITZ JOHN PORTER is 64 years of age.

THE American Catholics are to establish a university at Washington.

THE Hancock memorial fund at present amounts to \$39,000.

LAGARTIJO, the chief espada, or bull-fighter of Madrid, is employed there during the summer season for \$6,000, and he made another \$10,000 in the provinces during the winter. He claims to have killed 345 bulls without being personally injured.

JOEL CHANDLER HARRIS, the Uncle Remus of the *Atlanta Constitution*, will soon wed Miss Caroline Muggs, a wealthy young lady of North Carolina, who is also a niece of Stonewall Jackson.

MME. ALBANI customarily wears only two pieces of jewelry. One is a splendid diamond and emerald bracelet inscribed: "From Victoria, R. I. 1885." The other is a costly gypsy ring given to her by her old and valued friend, Lord Dudley.

IN New York City during the past year, 75,042 persons were arrested, 53,683 were held for trial or summarily convicted, and of this number 36,432 were males and 17,251 were females.

A PENNSYLVANIA geologist declares that the oil fields of that State have passed their meridian, and that the supply of natural gas is limited.

LIEUTENANT GENERAL PHILIP H. SHERIDAN is 55 years of age. With the exception of General Miles, he is the youngest general officer in the regular army.

NOW COMES the Minneapolis *Tribune* with an account of the cure of an inordinate appetite for tobacco in all its forms through a toboggan accident.

KING HUMBERT, of Italy, in an economic mood, has given instructions to his court enjoining it from drinking the high-priced wines.

FLOUR MILLING IN THE SOUTH.—The general progress of industrial pursuits during the past year in the South, is well illustrated in the advancement made in milling and the improved condition of milling interests all through the South. While all staple industries have shared in the propitious changes of the year, the great development of capacity in flour making shows that the onward movement is yet progressive and the steady increase in the demand for food products from a growing permanent population points to the continued prosperity of all industrial pursuits. During the year nearly 150 mills have been erected in the Southern states, not including grist mills. A list published by a Southern manufacturing exchange summarizes the year's work as follows: Arkansas and Mississippi have erected 1 mill each;

Alabama, 2; South Carolina, 3; West Virginia, 7; Maryland, 9; North Carolina, 10; Georgia, 17; Texas, 18; Virginia, 20; Tennessee, 24; Kentucky, 31.—*N. Y. Tribune*.

SIZE OF STONES IN MASONRY.—In many edifices, both ancient and modern, it has been observed that the stones used were too thin—i. e., that they had not sufficient thickness in proportion to their length, and that in consequence they broke under the weight. These accidents arose from the stones not resting equally throughout the whole surface of their beds, either because these surfaces were not exactly dressed or leveled, or because some unequal settlement took place which deranged the lower stones. The greater the thickness given to stones relative to their length, the greater is the power of resisting this effect, which it is often very difficult to foresee or prevent. For works which have very great weights to carry, such as walls and points of support, cubes are the strongest, but they have less stability and do not form sufficient bond; those in which the length is much greater than the height have more bond but less strength to carry the weight. According to the experiments made on stone, the length may be fixed at from twice to thrice their height, and their width from once to twice, supposing the stone of moderate hardness. When stones are very hard, more than a foot thick and wrought on all sides, their length may be from four to five times their height, and their width from two to three times. Larger dimensions increase the expense without adding to the utility.

ETRUSCAN ARCHITECTURE AT ROME.—The theatres and amphitheatres are the only civil buildings of which there are any remains in Etruria that offer any idea as to what they were like. The form of the amphitheater as adopted by the Romans, is essentially Etruscan. There are the remains of many works of utility, drainage works, bridges and city walls, monuments of their science and skill that, Ferguson says, "their successors never surpassed." They do not seem to have had any temples or palaces worthy of attention; in fact, the only interest Etruscan art possesses is that it is an introduction to the Roman. From the city gates, aqueducts and bridges, we know that the Etruscans used the radiating arch at a very early date. They were constructed with deep voussoirs or arch-stones, with elegant mouldings.

During the first two and a half centuries Rome was an Etruscan city, wholly under Etruscan influence. During this period, we read of palaces and temples and of works of immense magnitude being built for the embellishment of the city. After expelling her king, Rome existed as a republic for five centuries without doing anything that we know of to advance either art or science.—*W. L. B. Jenney*.

BRITTLE STEAM BOILERS.—Peter Carmichael recently read a paper upon steam boilers before the Scotch Institution of Engineers, in the course of which he mentioned that it had been found that "all qualities of iron get hard and brittle after the boilers have been at work more than a dozen years, more especially where exposed to the action of the fire; and that in the furnaces, even Lowmoor iron becomes as brittle as common iron in that time, and great care has to be taken in mak-

ing repairs to prevent the plates from cracking. For this reason 16 to 17 years is long enough for a boiler to be in use, at a pressure of 40 to 45 pounds. If used longer, the pressure ought to be lowered." Two boilers which had been in use 19 years, and which required repairs, were found by Mr. Carmichael so brittle that the rivet heads on the outside flew off when the inside heads were struck, showing that the rivets had deteriorated as much as the plates.

AT the funeral of the late King of Spain an imposing and curious scene occurred, which, it seems, is a custom peculiar to that country. When the procession reached the monastery connected with the Escorial Palace, the Duke de Sexto, the Royal Chamberlain, knocked, and requested admittance for Alfonso. When inside the gates, the Duke unlocked the coffin and called three times in Alfonso's ear. Then according to the ritual, he said: "There is no reply. It is true, the king is dead!" He then relocked the coffin, and broke his wand of office.

IN New York City, the telephone companies have united and raised the rate from \$5 to \$12.50 per month. The board of trade transportation committee have requested the Senate to take up the question, and have compiled a table showing the charges per month in various cities, which is as follows:

New York.....	\$12.50
Chicago.....	8.00 to \$10
Philadelphia.....	10.00
Boston.....	6.00 to 12
Baltimore.....	4.00 to 7
San Francisco.....	5.00
Buffalo.....	4.00 to 10
Albany and Troy.....	4.00 to 5
Rochester.....	4.00 to 12
Syracuse.....	4.00
New Haven.....	2.50 to 6
Providence.....	3.50 to 5

Kansas City charges \$6.00 per month within one mile of the central office, and an increase over this amount for distances more than one mile.—*K. C. Commercial*.

COUNTERFEIT MONEY.—There are some spurious manufactured coins which gain a ready circulation. These are a genuine \$5 coin, containing \$3.65 worth of Etruscan pureness, and an iron dollar heavily plated with silver, which has the true ring, and is but slightly defective in weight. These are not turned out in any great quantities and are evidently handled by some close corporation, which has not yet been ferreted out. These coins can be detected only by experts, and consequently are the most dangerous ever turned out. Fortunately there are comparatively few of them in circulation, and the people have not been mulcted to any great extent. But Treasury note counterfeiting, which created such a panic some years ago, has virtually ceased. There is one man at the present time who is a genuine artist and capable of attempting the feat, and that man is Tom Ballard, and he's safe enough in the penitentiary.—*Albany Express*.

AN idea of the vigorous growth of the iron industry on the Pacific Slope, is presented by a glance at the catalogue of the Pacific Rolling Mill Company, of San Francisco. On our farthest Western limits, in less than two decades, has grown up an establishment rivaling in the variety of its products the most extensive iron and steel works of the Eastern States. From it a railroad may obtain

nearly all its iron and steel supplies, from rails and car axles to the smallest bolts and spikes. The structural iron and steel for the largest buildings can be furnished on short notice; and the iron and steel for all the implements of agriculture are also provided from the same works.

THE WHEATEN LOAF.—Good wheat bread and butter is the staff of civilized life. Take away wheat bread and butter from our families for a few generations, and who is prepared to say that civilization would not glide easily to a state of barbarism? There is sound philosophy in this suggestion, because there is no other kind of human food that is so admirably adapted to the development of the human frame, including a noble brain, as good wheat bread. Civilization has seemed to keep pace with the production of wheat, and refined society, the world over, has seemed to exist coeval with the wheaten loaf.

LABOR was never in this country so united and its cohesion so perfect. But it will be the great misfortune to the laborer when he can persuade himself and the world that capital and labor are antagonistic. Capital must be prosperous if labor is. When men refuse to invest their capital because of this antagonism there will come evil days for the laborer. It will be a realization of killing the goose to get the golden egg. Let every wrong be righted, but don't in turn let labor turn the oppressor and stab itself.—*Inter-ocean*.

CLOTH is being made at Norristown, Pa., from wool imported from Gladstone's Scotch farm. The cloth is to be sent to the Prime Minister of England.

TAKE the product of the Connellsville coke region last year, load it on cars hitched together in a continuous train, start the train running twelve miles an hour, to run uninterruptedly day and night; stand beside the track and watch the silver-gray snake crawl by, each hour counting for eighteen thousand tons of coke, and toward morning of the ninth day, when the forward end of the train is jolting down the sunset side of the Rocky Mountains, the rear cars will still be within the clutch of the Pennsylvania police. Stretch the train straight across the continent, and the headlight of the locomotive will be flashing out through the Golden Gate while the red lamps at the other end are glimmering in New Jersey bogs.

AMONG millers and grain producers, as well as among consumers, there is just now less interest manifested in new milling machinery and new processes of flour making than in the actions of the bulls and bears who make a foot-ball of the grain markets. Tailings, scalping, screenings, returns, reductions, breaks, purifyings, high grinding, low grinding, stones, rollers, centrifugals and dust collectors are thrown into the shade by the superior importance of puts and calls, options and straddles, longs and shorts, poundings and boostings, milkings and forcings, to which the grain markets are subjected by the speculators.—*Exchange*.

BOARDS of Trade are spoken of as "On 'Change," because those frequenting them always go on changing one thing for another, from day to day and from hour to hour, until they burst up, and they are "a little off."

A GREAT number of British seamen engaged in a demonstration in London, recently, expressing their disapproval of the neglect shown by the Government in taking no steps to relieve trade depression. They declared that British labor was being sacrificed in the interests of foreign labor, and that free trade was killing the industries of the British Empire. British seamen appear to have quite an adequate idea of the effects of free trade on the people of any country by which it is adopted.

EVERY BOY SHOULD HAVE A TRADE.—In this country every boy, rich or poor, is the better off for a trade. The lad favored by fortune does not require mechanical knowledge to earn his living, of course; but an industrial training may develop in him a genius for invention that would benefit the whole race; and a trade in the hands of a poor boy is a sure means of gaining a living. If all classes are to be reached, therefore, it is hard to see how this can be done without an industrial training department in each school.—*Exchange*.

NOT less than \$800,000,000 is invested in mining enterprises as productive capital in the the United States, and over 400,000 people are furnished employment, and the mineral product of the Union, for the year 1884, had a value of \$413,104,620.

IN the last issue of this journal the fact was noted that Marshall & Co., of Leeds, England, the largest flax spinners in the world, had definitely announced their intention of transferring their immense plant to the United States. Significant as this announcement is, it finds a counterpart in the publication of a dispatch from London, under date of the 9th inst., that the great steel manufacturer, Marshall, of Sheffield, is about to remove his entire works to this country. The steel works owned by Mr. Marshall, at Sheffield, employ three thousand men. It is said some scores of the most skilled men working at the works will be brought over, and the full complement of men will be made up from among skilled workmen found in this country. The *Textile Manufacturer*, a strong free-trade journal, published at Manchester, in commenting on these transfers, remarks: "When we reflect that such important concerns do not take such steps as this without due consideration and straining every nerve to avoid them, it begins to be seen how a change in the economical arrangements of one country may affect the well-being of hundreds of hard-working operatives in other parts."—*Manufacturer*.

THE immense Krupp works at Essen, are rigorously closed against visitors; the outside world has therefore been unable to learn much of the renowned establishment where the most terrific engines of warfare are made for Germany and her friends. At last a determined Yankee has penetrated into this mysterious realm of the modern Vulcan, with full privileges of confiding his discoveries to the rest of mankind, and the result is a deeply interesting article in the March HARPER's, called "An Iron City beside the Ruhr," by Moncure D. Conway, with an abundance of illustrations.

In describing at length such an attractive field for the first time, it is not strange that Mr. Conway reveals some startling facts and

conveys much rare information. The curious processes of steel-working are graphically depicted. It seems that the Krupp guns, which have elevated Germany to the highest military rank, and by whose reputation alone the Essen works are generally known, engage but a small part of Herr Krupp's attention. Two-thirds of the work is devoted to the arts of peace. His establishment is said to constitute the largest business in the world, dependent on a single individual. We can appreciate this partly when told that it covers over 500 acres, employs more than 20,000 hands, includes colonies of 4000 laborers' houses, with churches, schools, stores and hospitals; that Herr Krupp owns, among other possessions, 547 iron mines, 4 sea steamers, about 500 steam-engines, and 50 miles of railway; that he produces daily 2½ miles of rails, 1500 bomb-shells, and untold quantity of other things. The colossal hammers, the belching furnaces, the frightful abysses of molten steel, and the astounding weapons of war and of peace here manufactured, give the reader an impression that this is a kingdom where the work of Titans is done by pygmies, and where Dante's awful imaginings are excelled by actual realities.

DUTY ON CORN.

The following resolution on this subject was adopted at the last annual meeting of the Monmouthshire Chamber of Agriculture: "That, in the opinion of this meeting, it is matter of the highest importance that the cultivation of wheat and other cereals should be extended in this country, and that the laying down of so much land to grass is a national calamity, inasmuch as by so doing produce is diminished and labor thrown out of employment. That an import duty of 5 shillings per qr. on corn would have the effect of steadying the price of wheat, checking the decline of corn-growing, without materially adding to the price of bread, and would be beneficial to the community at large. That such duty should be imposed on foreign corn, but that an effort should be made to draw the colonies nearer to the mother country by arranging for perfect freedom of trade in them."

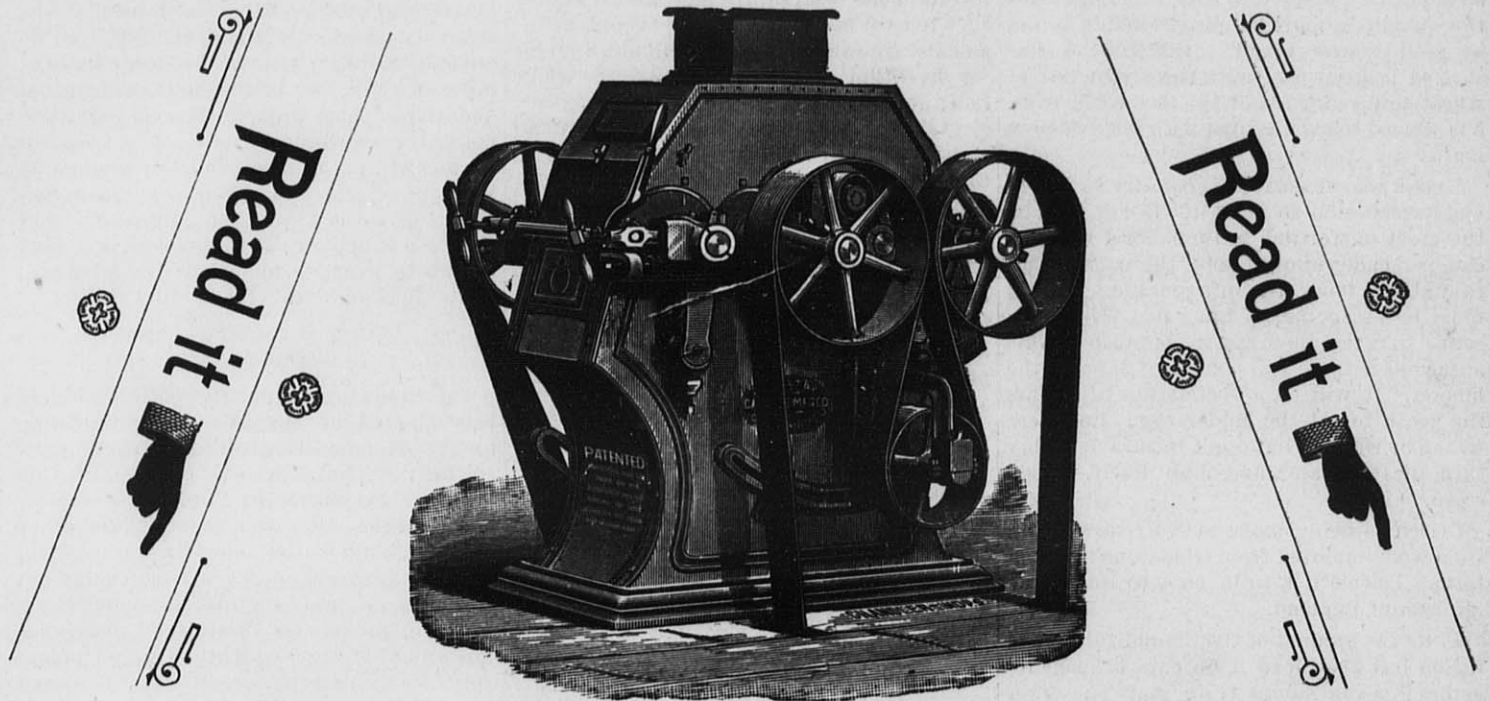
The York Chamber of Agriculture, at a meeting held at York recently, considered a resolution in favor of imposing a duty on imported corn, sugar, and manufactured goods, exclusive of the colonies. The chairman (Mr. Newton) referred to the depressed condition of agriculture, and said the only protection which we could obtain was to produce goods cheaper than we do now, and as cheap as those produced by other countries. Protection would be no safeguard against our present sufferings, and therefore he hoped the Central Chamber would not endorse any resolution of the kind. The motion, on being submitted to the Chamber, was lost, and an amendment carried deprecating any resort to a protective system. The Central Chamber was urged to pass a resolution in favor of the appointment of a Minister of Commerce.—*Miller's Gazette*, (London).

WE will send you a copy of "Leffel's Construction of Mill-dams, and Bookwalter's Millwright and Mechanic," and "The U. S. Miller" for one year for \$1.30. Don't miss it.

POSITIVE PROOF.



Nothing can produce more Substantial Evidence of the Superiority of our Mills than the facts set forth in the following letter.



OFFICE OF HOPPIE BROS.,
BROKERS AND COMMISSION MERCHANTS,
No. 4 KIMBALL HOUSE, WALL ST.,

CASE MANUFACTURING CO., COLUMBUS, O.

ATLANTA, GA., DEC. 16TH, 1885.

GENTLEMEN:—We have very gratifying success with the flour and "Roller" meal purchased from mills running on your system of milling. We buy and sell largely at wholesale. Our territory extends to the largest cities of four states, and the products from your system gives much better satisfaction than any others we can obtain. The praise we receive is universal. We would be glad therefore to obtain the names at any time of the mills you fit up that we may correspond with them. Please let us hear from you.

Yours truly,

HOPPIE BROTHERS.

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